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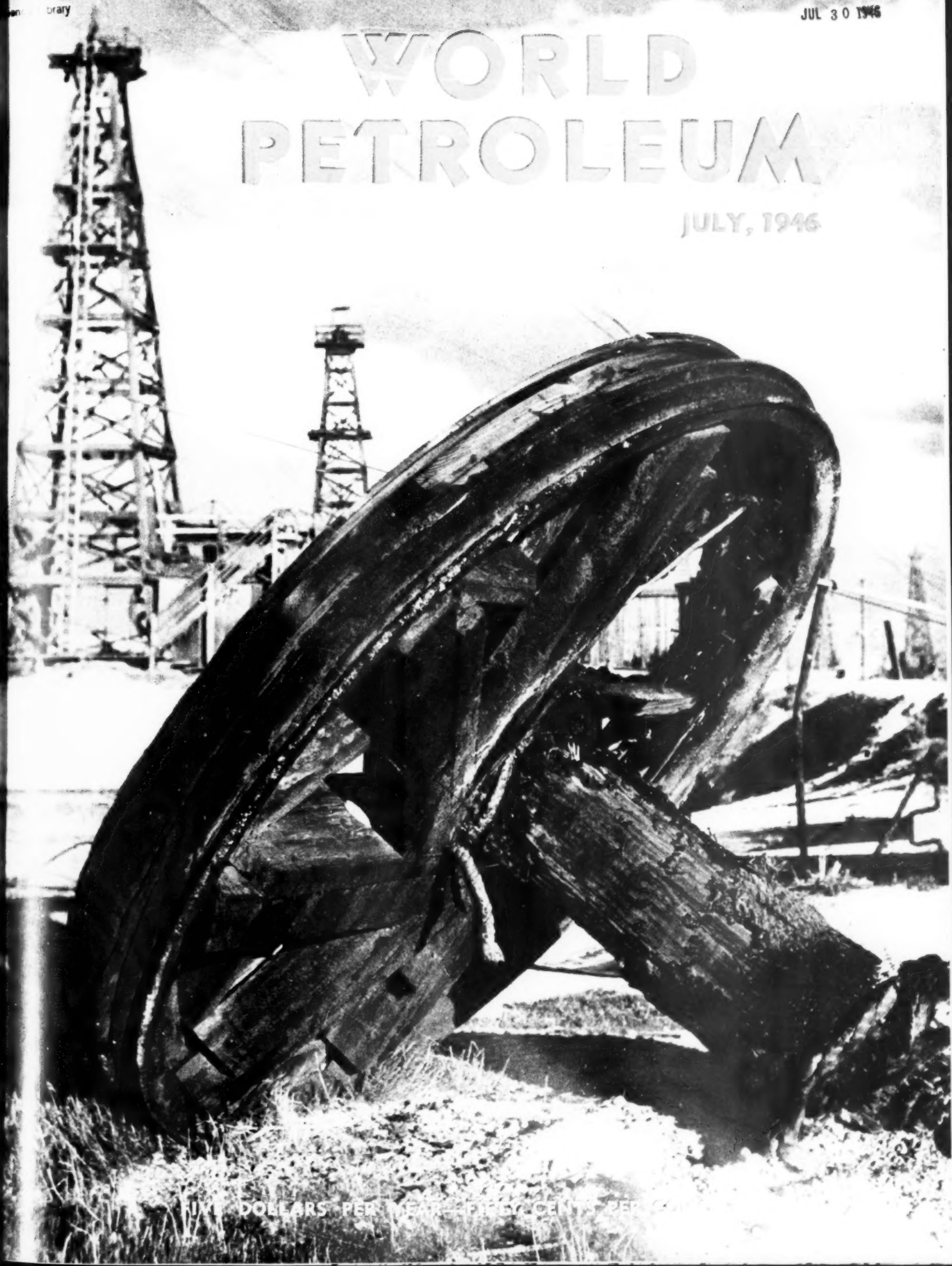
WORLD PETROLEUM

JULY, 1946



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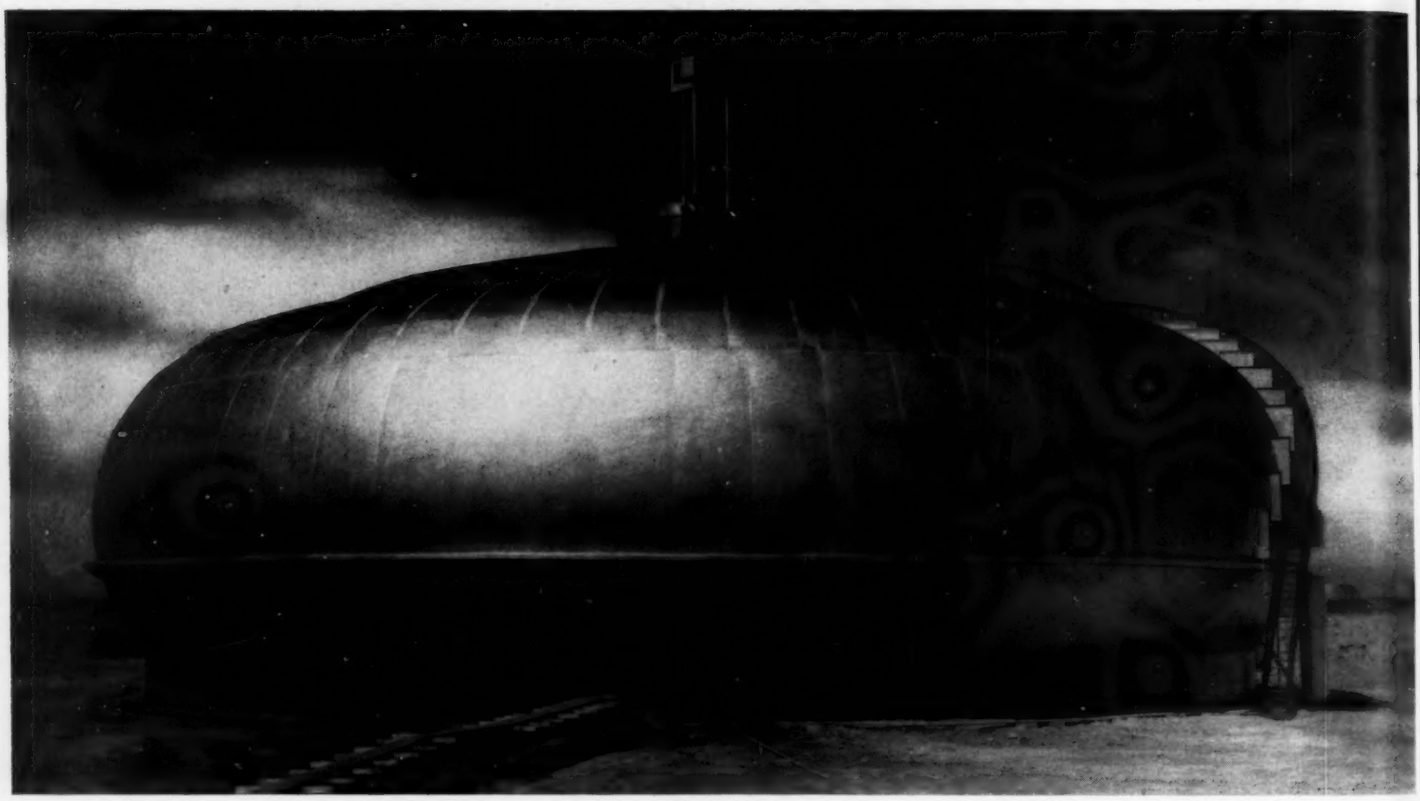

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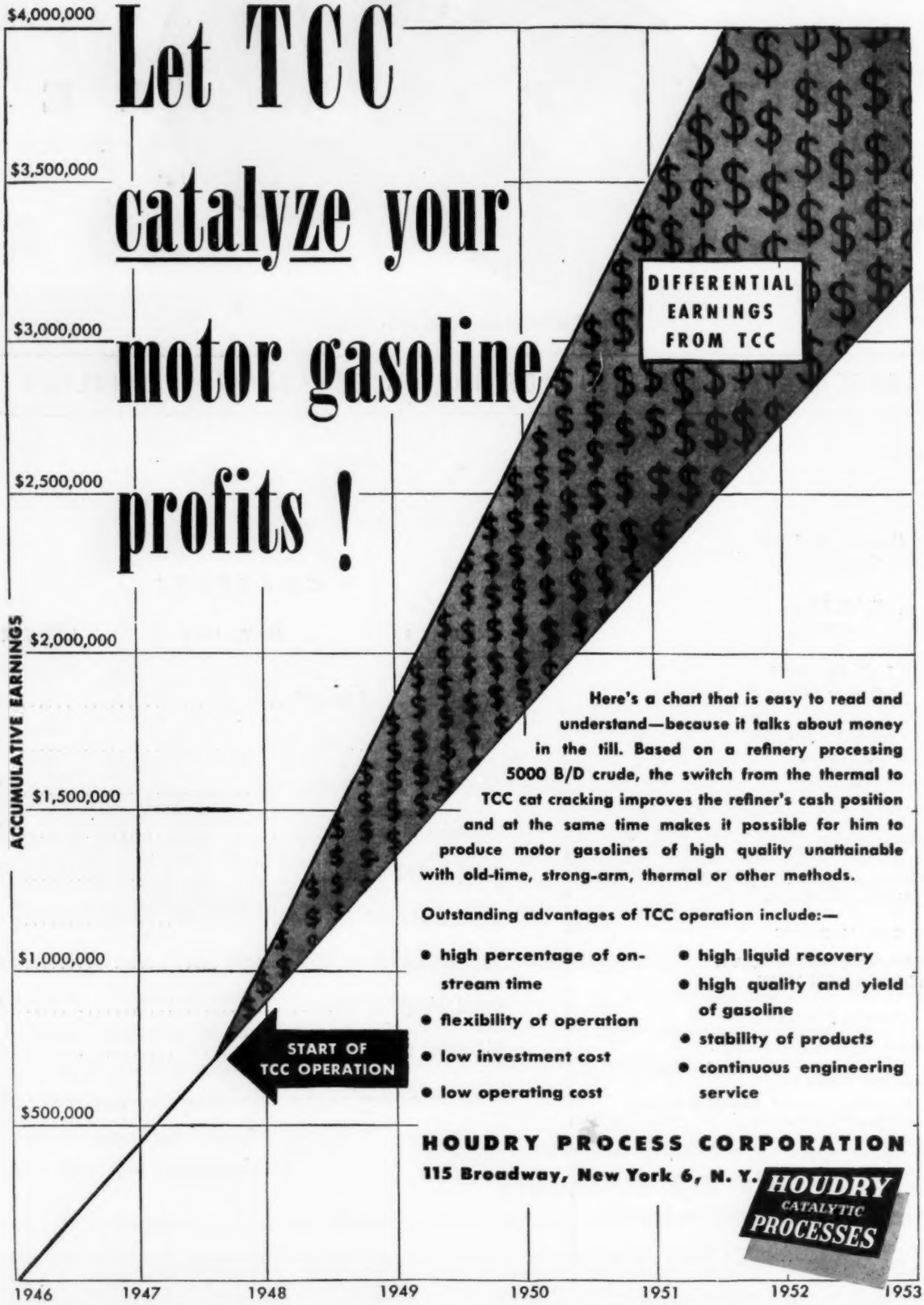

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EDITORIAL

PRESERVE FREEDOM OF RESEARCH

AMERICA'S remarkable record in industrial achievement has long been recognized and was never before so strikingly demonstrated as in the war so recently ended. Admittedly its great progress in this field has been responsible for high productivity per worker which has permitted the establishment of the highest standard of living attained by any country.

So many of the early mechanical devices and manufacturing methods that started American industry on its career of efficiency were devised by individual experimenters that the term Yankee ingenuity became a by-word. As time went on and the value of mechanical aids to manual effort became more fully appreciated the large business organizations that had been built up to utilize the tools of large scale production sought out men of originative ability, established them in laboratories equipped with all manner of aids to scientific research and surrounded them with staffs of highly trained technicians. All this was done to broaden the horizons of industrial research and to make possible the development of new and better products and the introduction of fresh economies in the treatment of materials. The change was in line with the whole trend of industrial progress which substitutes team work for the single-handed efforts of individuals. It was made possible by the patent system of the country which always had held out the possibility of liberal reward to the originator of a better mouse trap or a more effective combination of molecules. The system justified itself in commercial applications and in time of war it aided mightily in winning victory when the nation was attacked.

It seems incongruous that directly after the impressive demonstration of the effectiveness of private initiative in bringing America to the apex of industrial power an attempt should be made to overthrow the system on which this progress has been built. Yet this is exactly what is being attempted by bills now before Congress which would weaken the patent law by removing much of the incentive to discovery and would go far toward placing the control of research under the federal government.

An ambitious project for the elaboration of the federal government's activities in the field of research is the bill introduced in the Senate in April last to establish a National Science Foundation, an independent agency of the government embracing several divisions devoted to physical science, social science, medical science, engineering and technology and so forth. Of course, there is nothing new in the conduct of scientific research by the government. The point that differentiates the present plan from such previous activities is the evident purpose to extend a greater measure of official influence over the conduct and results of research conducted by other than governmental bodies. Of the funds appropriated to the Foundation, it is specified that one quarter shall be apportioned among the states, the distribution to be made on the basis of population rather than the facilities for research which they have to offer.

Other sections of the bill provide that contracts may be made with private organizations for research for which they have special facilities. In general, inventions or discoveries resulting from research to which the Foundation has contributed are to be made available to the government and through it to the public without charge or reservation. In certain cases private interests may retain patent rights based on their discoveries to such extent as the head of the government agency "deems fair and equitable."

The effect of such a provision would be to give the government a controlling voice in deciding whether an institution or organization that has conducted research under contract to the government shall be allowed to profit by studies which it has had under way, perhaps for years. Robert P. Russell, head of Standard Oil Development Company, has pointed out in a paper published elsewhere in this issue the obstacles to participation by most research organizations with a government foundation owing to the fact that research activities directed toward different activities may be closely related.

Because of the hundreds of millions that it expends annually on research and because of the vital relationship of such activities to its commercial operations the oil industry has a very direct interest in the maintenance of a patent system that will not discourage incentive and an even greater interest in preserving freedom of research. Scientific studies relating to problems of national defense or national health are a proper field for government aid and support but no sound reason can be advanced for extending government direction into fields of private enterprise since the results of research in such fields are always available to the government in times of emergency as they were in the latest crisis confronting the nation.

MARACAIBO BASIN IS SOUTH AMERICA'S LARGEST PRODUCING AREA

By ANNE NEWMAN SUTTON

DUE to developments that have taken place since the discovery of the Mene Grande oil field in 1914, the Maracaibo basin, about 90 percent of which lies in northwestern Venezuela and 10 percent in eastern Colombia, has assumed an importance that places it first among the oil-producing areas in South America, and perhaps first among those of the Western Hemisphere. In fact, its thirteen active fields, many of which are highly productive, make it one of the outstanding petroliferous regions of the world.

One of the four drainage areas in Venezuela, it is larger than the Falcon basin adjoining it, compares favorably in size with the Apure, and is about one half the size of the Orinoco basin. It lies west and north of these, extending across three degrees of latitude (north 7° 50′ to 10° 50′) and two degrees five minutes of longitude (west 70° 50′ to 72° 55′). It is about three times the state of Massachusetts or about one third as large as the state of Washington. It could be placed in the state of Texas eleven times with room to spare.

The Maracaibo basin occupies the expanding angle between the Andes de Merida and the Sierra de Perija, two mountain ranges that stem from the Cordilleran chain of South America. The Sierra de Perija, which forms the boundary between Venezuela and Colombia, is the smaller range and its maximum elevation does not exceed 10,000 feet, whereas elevations in the Andes de Merida are sometimes greater than 16,000 feet. The basin proper has a maximum north-south length of 236 miles and a maximum width of 149 miles. Its area is approximately 23,500 square miles.

The rivers which comprise the drainage system of the basin rise in the high watersheds of the Sierra de Perija and the Andes de Merida, and flow into Lake Maracaibo. The principal carriers are the Rios Limon, Palmar, Negro, Santa Ana, Catatumbo, Chama, and Motatan. The largest of these are found in the southern and southwestern parts of the area. Lake Maracaibo, which is situated in the northeastern part of the basin, has an area of approximately 5,000 square miles and a maximum depth of 131 feet. It is connected with the Caribbean Sea through a bottleneck opening on the north into the Gulf of Venezuela. As one would expect, the northern waters of this lake are brackish.

The land in the basin proper is low, at no point rising higher than 350 feet above sea level, and its nearness to the equator makes it hot and tropical, the mean annual temperature ranging from 75° to 95°F. The two Spanish words, "tierra caliente" or hot country, apply to every square foot of the basin lowlands. In the arid regions to the north, where is located the city of Maracaibo, rainfall is inadequate for agricultural purposes, and such vegetation as cactus and divi-divi are typical. However, to the south, where the rainfall is heavy and even excessive in some places, mangrove swamps and jungle become progressively common.

Although the basin proper is essentially blind from a geological standpoint, the bordering highlands expose a stratigraphic section which extends from the pre-Cambrian to Recent. The petroliferous sequence, however, extends only from the base of the Middle Cretaceous to the top of the Middle Miocene. Representatives of all the major subdivisions of the time scale are present in this latter sequence. This section, which has a composite overall thickness of approximately 23,000 feet, can be divided into seventeen recognizable geologic formations, all but two of which are commercially productive at one place or another within the basin.

The recurrent Andean movements which lifted the Andes de Merida and Sierra de Perija to their present heights and gave the Maracaibo basin its present topographic and structural

Lagunillas field, Lake Maracaibo

form, are reflected in a number of subordinate structural trends which lie basinward and parallel to the major unlifts. It is along these trends that the outlying oil fields of the basin are situated.

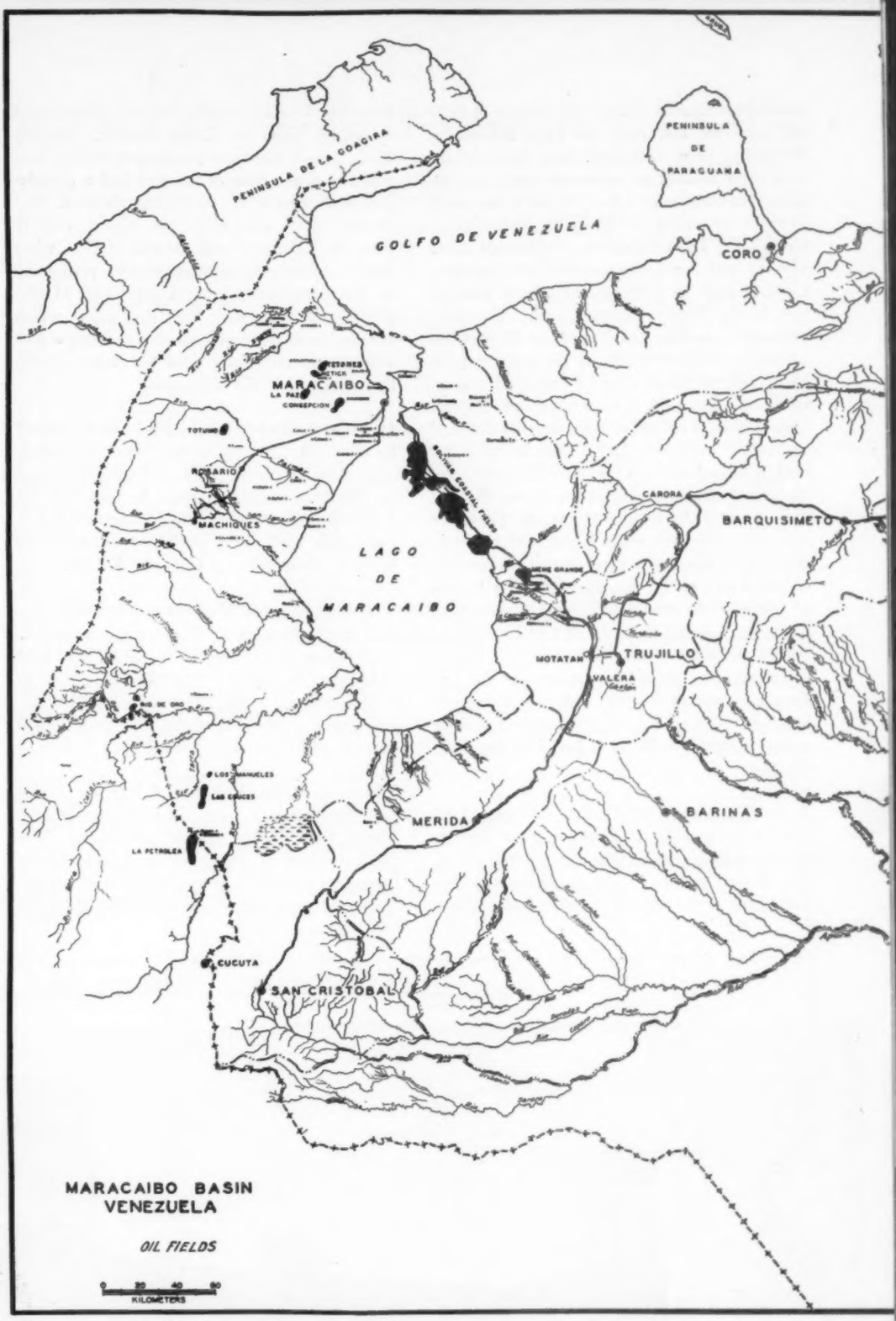
The Bolivar Coastal field, largest in the area, occupies a position on the high northeastern flank of the basin. The type structure in this field is largely monoclinal in the post-Eocene sediments which have accounted for approximately 98 percent of the field's production to date. The type accumulation is largely stratigraphic. In the underlying nonconformable Eocene, however, accumulation may be either structural or stratigraphic.

The development of the petroleum industry is tied up with the country's history and is suggestive of adventure and romance. Although Alonzo Ojeda, who discovered the lake in 1499, was not interested in the geology of the country and knew nothing of the wealth that was to come from oil, the navigators and buccaneers of the sixteenth and seventeenth centuries were near the lake shore. As a matter of fact, they fully aware of the pitch and asphalt deposits put these to practical use on their damaged vessels, giving them preservative coatings and calking the seams, never dreaming that beneath the waters they sailed, were vast reservoirs of the same substance.

Although the numerous surface indications of petroleum attracted the attention of early explorers, it was not until the close of the first decade of the present century that oil companies became actively interested. In 1914, the Caribbean Petroleum Co. Inc. (Shell Oil Co.) discovered the Mene Grande oil field east of Lake Maracaibo. During 1945 this field produced 12,831,000 barrels of oil, and had a cumulative total at the end of the year of 278,284,000 barrels. Production is obtained from the Miocene and the Eocene. It is interesting to note that the discovery well for the Eocene, which was drilled in 1924, had produced a total of 14,656,000 barrels by the end of 1945, and was still flowing at a rate of 200 barrels per day. This is the maximum production for any individual well in Venezuela and probably in all South America.

The discovery of the Mene Grande field was followed in 1915 and 1916 by the Rio de Oro and the Las Cruces (Tarra) fields southwest of the lake. Early exploratory drilling at Rio de Oro encountered commercial accumulation in the Eocene but this field has never been actively exploited. The Las Cruces (Tarra) field which is also an Eocene producer, accounted for 3,873,000 barrels in 1945 and at the close of the year had a cumulative production of 58,830,000 barrels.

In 1917, Venezuelan Oil Concessions, Ltd. (Shell Oil Co.) drilled the discovery well of



Workers' homes at Camp of Mene Grande Oil Company at Taparito, State of Zulia.

the Bolivar Coastal field in the District of Bolivar near the east shore of Lake Maracaibo. Naturally, these successful finds drew to the area other leading oil companies and some independent operators, so that within a few years, Western Venezuela had grown feverish with activity. The Lago Petroleum Corporation (now Creole) and the Mene Grande Oil Company, C. A. (Gulf Oil Corporation) became very active in the Bolivar Coastal area. Extensive exploratory drilling was carried out by all three companies, and by 1930 the approximate present outline of the Bolivar Coastal field was established. Its length is 42.5 miles and its maximum width 10 miles. It lies partly on the land and partly within the lake. During 1945, this field produced 186,861,000 barrels of oil, and the cumulative total production at the close of the year was 2,188,339,000 barrels. From the standpoint of volume of crude produced, the Miocene has accounted for approximately 98 percent of the field's total production, and the Eocene for most of the remainder. In this connection, however, it should be stated that active exploration in the Eocene has taken place only during the past six years, and indications are that the Eocene percentage of the total production will increase progressively as time goes on. The proved area of the Bolivar Coastal field is 175,000 acres.

In 1925, the Shell Oil Company discovered La Concepcion and La Paz fields in the District of Maracaibo, west of the city of Maracaibo. The former produced 1,355,000 barrels during 1945, and at the close of the year had a cumulative total of 29,119,000 barrels. Production is entirely from the Upper Eocene. During 1945, the La Paz field produced 8,049,000 barrels and at the close of the year had a cumulative production of 19,196,000 barrels of oil. Production from this field was almost entirely from the Paleocene until the end of 1944 when deeper drilling encountered prolific production in the limestones of the Upper and Middle Cretaceous. The large 1945 production, which is approximately 40 percent of the field's cumulative total, can be accounted for largely by this new discovery in the Cretaceous.

In 1927, the Los Manueles field was discovered by the Shell Company in the District of Colon, nine miles north of the Las Cruces field and on the same regional uplift. It accounted for 1,933,000 barrels of oil in 1945 and had a cumulative total at the year's end of 35,822,000 barrels. Production is from the Eocene.

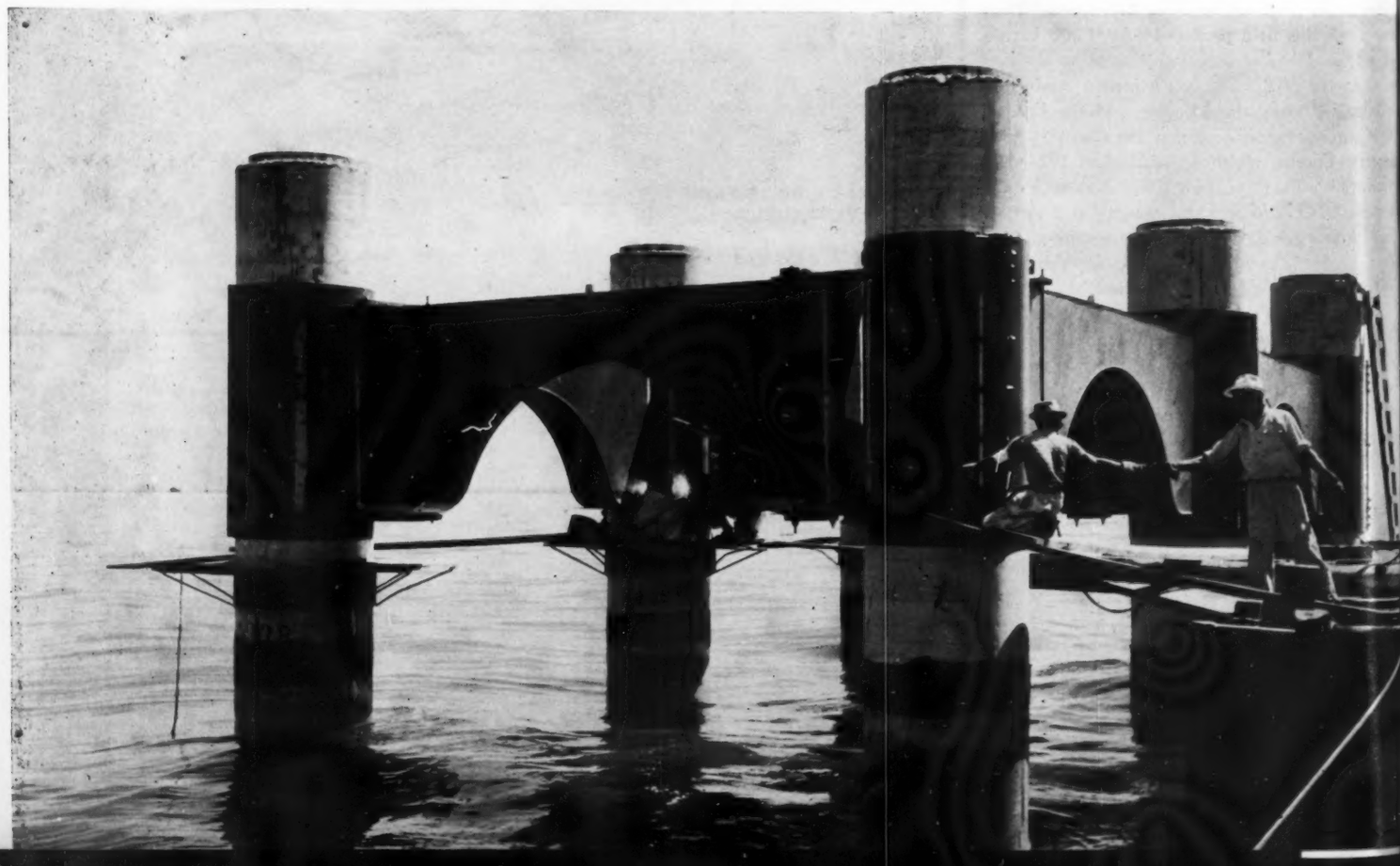
The small Netick field of the Orinoco Oil Company in the District of Mara, was discovered in 1929, about six miles north of the La Paz field and along the same trend. Its production in 1945 amounted to 146,000 barrels and its cumulative total at the end of the year was 347,000 barrels. Production is from Upper Eocene.

The most recent discovery of importance was early in 1945 at Tetones, six miles north of the Netick field, in the District of Mara, where Shell encountered substantial production in the limestones of the Upper and Middle Cretaceous. This field produced a total of 1,140,000 barrels during 1945. The field was shut in most of the year awaiting a pipe line outlet to a lake terminal.

Attempts to develop production in the Barco Concession in Eastern Colombia began as early as 1920, but it was not until the discovery of the Petrolea field in 1933 by the Colombian Petroleum Company (Socony Vacuum-Texas) that an active exploration and exploitation program was inaugurated. Since that time, four small additional fields have been discovered but Petrolea still accounts for most of the production. Fields of the Barco area produced 5,540,000 barrels of oil in 1945, and the cumulative total as of December 31, 1945, was 23,013,000 barrels. Production is from the Cretaceous and Eocene, with the former producing the greater amount by far. Outlet for the Barco Concession oil is via a 252-mile pipe line to the Colombian port of Covenas on the Gulf of Morrosquillo. This line crosses the Sierra de Perija at an elevation of 5,284 feet.

The outlet for the crude from the outlying fields in the Venezuelan portion of the basin is by way of pipe lines to lake terminals, and thence by shallow draft tankers to the deep water terminals and refineries of the three major operators. Crude from the Bolivar Coastal field is loaded directly into the lake tankers. A large portion of Creole's oil from the Bolivar Coastal field goes to Aruba where Lago Oil and Transport Ltd. maintains a large refinery and deep-water terminal. The Shell Company has a similar installation on the Dutch Island of Curacao.

Drilling foundation under construction in the lake. (Photo courtesy Standard Oil Co. (N.J.)

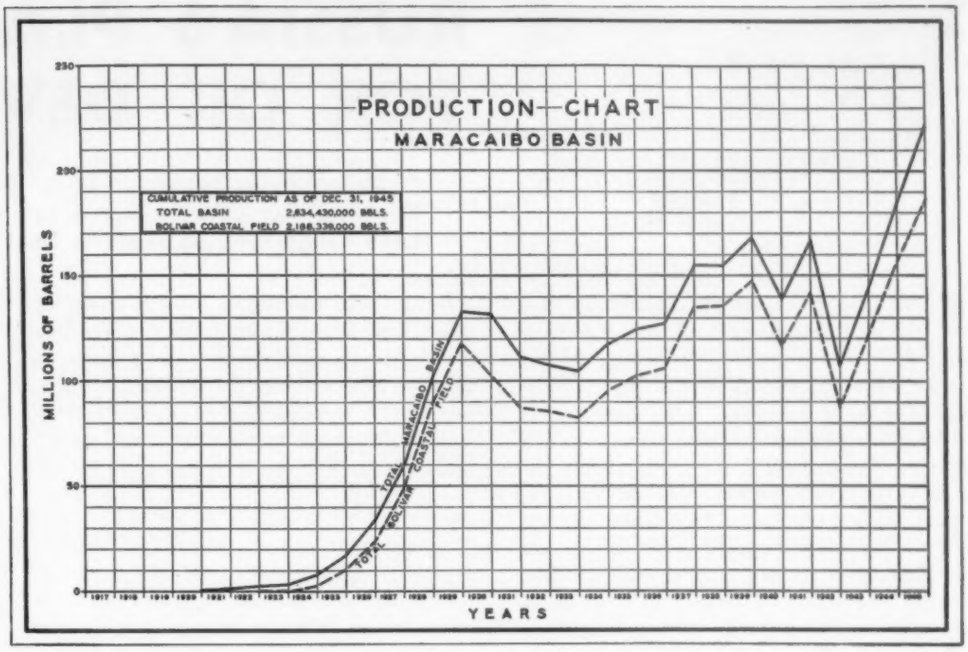


The Mene Grande Oil Company has a deep-sea terminal at Las Piedras on the Venezuelan peninsula of Paraguana. Refineries for supplying local needs are operated by the Creole Petroleum Corporation at La Salina and the Caribbean Petroleum Company at San Lorenzo, on the shores of Lake Maracaibo.

Additional data concerning the fields already discussed, are listed in the accompanying table.

Following the passage of the present petroleum law in 1943, the Richmond Exploration Company (Standard of California) became actively interested in the Maracaibo basin and at present is carrying out an extensive exploration program. While it has no production to date, the indications in some of the exploratory wells are promising.

The industry has not developed without difficulties. Although in some cases prompt returns were received on the capital invested, in other cases enormous sums were spent before obtaining production, and in some instances, the money was spent quite in vain. Development of the Barco concession and also the Las Cruces, Manueles, and Rio de Oro fields in Southwestern Venezuela, were difficult undertakings in view of the hostile Motilone Indians that inhabit that area. Even today, field parties working in this region require armed escort. The enervating heat, tropical pests, and lack of sanitation, made exacting demands on the health of employees until the companies had had time to build modern camps and roads, and improve living conditions in general. As a result, living standards have improved for all inhabitants of the basin, including those not employed in the industry.



From small beginnings over thirty years ago, the production of petroleum has increased phenomenally, and at the present time, the proved area of production amounts to approximately 200,000 acres or roughly 1.3 percent of the basin's total area. During 1945 the Maracaibo Basin produced 221,730,000 barrels of oil or almost 9.0 percent of the world's reported total, which makes it the leading oil-producing center of South America and one of the outstanding oil-producing areas of the world. The cumulative total as of December 31, 1945, amounted to 2,634,430,000 barrels of oil. Of this total, the Bolivar Coastal field has accounted for 83 percent. The total remaining proved reserves of the Maracaibo basin are estimated in excess of 5,500,000,000 barrels.

OIL FIELD SUMMARY — MARACAIBO BASIN

Name of Field	Location State of Zulia Venezuela	Owners and Operators	Discovery Date	Producing Intervals	Number of Wells Drilled Prod.	Dry	Total	Grav. Range Deg. A.P.I.	PRODUCTION-BARRELS 1945	Total to Dec. 31, 1945	Proved Acres (Approx.)
BOLIVAR COASTAL	Dist. of Bolivar	Creole Mene Grande Ven. Oil. Conc.	1917	Eocene Oligocene Miocene	3905	95	4000	10-30	186,861,350	2,188,339,129	175,000
LA CONCEPCION	Dist. of Maracaibo	Ven. Oil. Conc.	1925	Eocene	141	6	147	29-40	1,355106	29,118,893	1,872
LAS CRUCES (TARRA)	Dist. of Colon	Col. Dev. Co.	1916	Eocene	144	25	169	19-37	3,873,367	58,830,384	2,578
LOS MANUELES	Dist. of Colon	Col. Dev. Co.	1927	Eocene	32	4	36	29-37	1,933,283	35,821,610	601
LA PAZ	Dist. Maracaibo	Ven. Oil. Conc.	1925	Cretacious Paleocene Eocene	76	6	82	13-35	8,049,038	19,195,804	2,344
MENE GRANDE	Dist of Sucre	Caribbean	1914	Eocene Miocene	482	19	501	14-30	12,831,103	278,283,963	10,460
NETICK	Dist of Mara	Orinoco	1929	Eocene	3	3	6	21-29	146,022	346,996	154
TETONES (MARA)	Dist of Mara	Caribbean	1945	Cretaceous	2	1	3	29	1,140,466	1,140,466	250
AMANA (1)	Dist of Mara	Mene Grande	1928	Eocene	1	1	2	31	——	31,362	337
LOS BARROSOS (3)	Dist. of Sucre	Creole	1922	Eocene	2	3	5	16-22	——	96,280	—
MISOA (3)	Dist. of Sucre	Creole.	1921	Eocene	2	2	4	15	——	8,000	—
RIO DE ORO (1)	Dist. of Colon	Col. Dev. Co.	1915	Eocene	3	1	4	26-28	——	54,877	332
TOTUMO (2)	Dist of Perija	Creole	1914	Basement Erosion Surface	11	1	12	19-21	——	149,352	741
						All Others	113	-			
					—	—	—	-	——	——	——
			TOTAL BASIN (VENEZUELA):		4804	167	5084	-	216,109,735	2,611,417,116	194,659
				COLOMBIA							
PETROLEA CARBONERA RIO DE ORO SOCUAVO TRES BOCAS	Barco Concession Santander del Norte. Colombia	Col. Pet. Co.	1933	Cretaceous Eocene	—	—	—	19-55	5,548,220	23,013,095	**5,000
			GRAND TOTAL:						221,729,955	2,634,430,211	199,659

(1) Inactive; (2) Abandoned; (3) Depleted; ** Estimated.

RUSSIA'S PLANS FOR OIL DEVELOPMENT

Outside Supplies Being Sought to Bridge Drop in Output During War — Five Year Plan Calls for Return to 1940 Level of Production in 1949 and Long Range Forecast Looks to Doubling of Pre War Output by 1960.

SINCE the termination of hostilities in Europe the great question mark in the international oil industry has been the Soviet Union. Uncertainty regarding the present situation within Russia in the matter of oil supplies and the policy which the Soviet government intends to follow has been heightened by the suppression of official statistics as to domestic production and distribution since a year or two before the war started, by the drastic action adopted to insure for Russian use all oil obtainable from the countries of eastern Europe which have come within the zone of Soviet dominance and by the aggressive steps taken to wring an oil concession from the government of Iran.

This is not the first time that Russia has presented an enigma to the international petroleum trade. In the nineteen twenties, following the Russian revolution and the conclusion of World War I, Soviet oil production increased rapidly and was strongly encouraged by the government. Having taken over the rich fields of the Caucasus developed by private capital under the Czarist regime the sale of oil offered itself as a convenient means of providing funds for the purchase of needed commodities. Soviet marketing organizations were set up in Europe and the East and provided troublesome competition for the private companies operating in these areas.

The threat of Russian exports became sufficiently alarming to the international companies, especially as demand for petroleum products slackened and prices fell as the world moved into the depression period, that it was largely responsible for the international oil conference held in New York in the summer of 1932. The conference was called in an effort to stabilize the international position but it resolved itself largely into discussion of a proposal by the companies represented to purchase Russia's surplus oil and to dispose of it in ways that would not disrupt international markets.

The negotiations fell through and the meeting failed to accomplish the result at which it had aimed. Shortly thereafter the adoption by the Soviet Union of the new economic plan for the country's industrialization led to an expanded domestic consumption of petroleum products and decreased activity in the export field. By 1939 the Russians had disposed of many of their foreign marketing organizations and had ceased to be an aggressive factor in countries where they were still represented. While strong emphasis was placed in successive five-year plans on the stimulation of the oil industry production failed to keep ahead of the rapidly growing demand and it became accepted opinion that Russia would not again become an important factor in oil export, at least not for many years to come.

By 1939 Russia's output of oil had risen to 216,000,000 barrels, a gain of 33-1/3 percent over 1931 but whereas in the earlier year exports absorbed more than one quarter of the production by 1939 over 90 percent of the much larger output was consumed domestically. Strenuous efforts were being made to improve operating methods and equipment in the older fields and exploratory efforts had resulted in the discovery of new production in the Volga and Ural regions, but while there was a substantial growth in output it failed to attain the full volume projected in the official five-year programs.

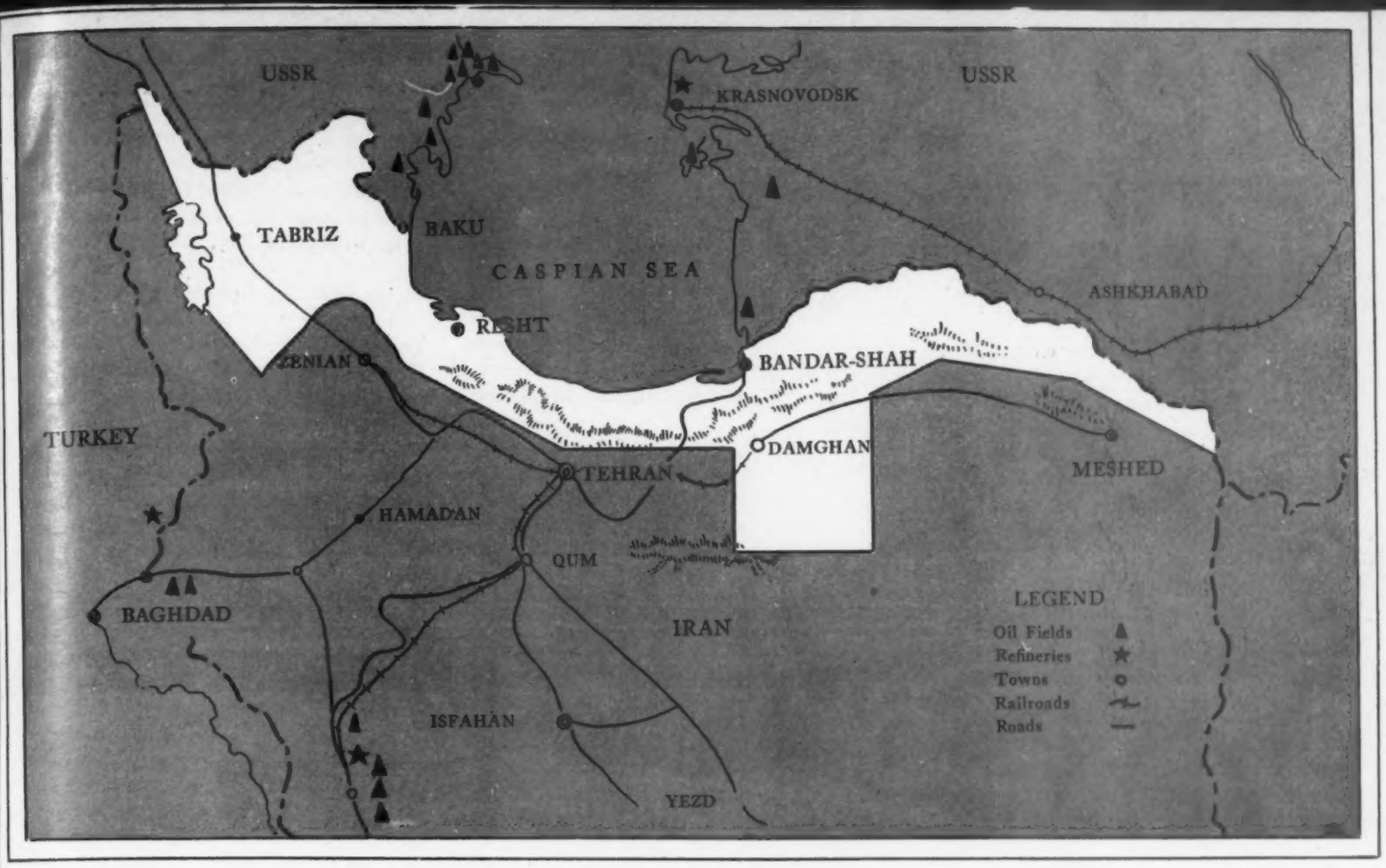
The war dealt some costly blows to the Russian oil industry. The Nazi invasion not only destroyed the refineries at Odessa, Kherson and Krasnodar but swept almost to the shores of the Caspian. The Maikop field was burned over by the Russians themselves before they yielded it to the invaders and Grozny, where the forward thrust finally stopped, was badly damaged, depriving the Russians of some 30,000,000 barrels of annual production. In Baku itself, which always has been the mainstay of the Russian industry, shortage of materials and labor reduced new drilling to a minimum and led to a serious decline in output. The war brought heavy additional demands for oil which the industry was unable to meet and Allied sources supplied more than 10,000,000 barrels of petroleum products consisting of high octane gasoline for planes and motor fuel for tanks and trucks to be used in military operations. Drilling machinery and refining equipment also was shipped from the United States to aid the Russians in building up their own production.

Throughout the war exploration was continued and according to statements in the Russian press 38 new fields were discovered. During the critical period of the war special efforts were exerted to increase production in the Ural and Trans-Caspian districts which were less exposed to attack than the Caucasus. The results of these activities, however, were not great enough to offset the decline in the older and larger fields. From comments published in Russian periodicals the conclusion has been drawn that crude production in 1945 possibly was in the neighborhood of 200 million barrels or somewhat less than it had been before the outbreak of the war. Such a situation would afford adequate explanation of the avidity which the Russians have shown in seeking to divert to their use as much as possible of the oil produced in neighboring countries that have come within their zone of influence. This policy has been followed persistently with the result that Russia is now receiving as reparations or through trade agreements by far the greater part of all the oil produced in Europe.

The methods employed are well illustrated by the case of Romania. This country is the largest oil producer in Europe aside from the Soviet Union itself. Its industry was developed by capital from the United States, Britain, France, Holland, Belgium and other countries. The only two important European nations not represented before the war were Germany and Russia. At the commencement of the war, Romanian production was roundly 46,000,000 barrels. When the Nazis moved in, attracted by the lure of this rich prize, they secured a nominally legal position by forced purchases of controlling shares in Petrol Block, Concordia, Columbia and other smaller companies. These were turned over to Kontinentale Oël Berlin, the Nazi-organized corporation which was intended to monopolize the oil industry of German dominated Europe.

Under the armistice terms which formally ended Romania's participation in the war reparations payments to Russia of $300,000,000 were exacted and half of the annual indemnity payment is being provided in the form of oil. This will require about 12,500,000 barrels out of a reduced production of 32,000,000 and in the event of a shortage of other deliveries additional oil must be provided. If this makes necessary the shipment to Russia of oil produced by foreign owners operating in Romania the Russian position is that these owners must look to the Romanian government for recompense.

By an agreement for economic collaboration signed in Moscow, May 8, 1945, the shares of Romanian companies forcibly acquired by the Germans and transferred to two Russian organizations were included in a new corporation Sovrompetrol, owned in equal shares by Russia and Romania. For its part the Romanian government turned over to the company its stock-



Map of Russian Oil Concession in Iran.

holdings in Creditul Minier and Redeventa, oil lands belonging to the government and 50 percent of the royalty oil received from its producers. By this maneuver Russia establishes a position in the Romanian industry second only to that of Romanian and British investors and slightly greater than that of the Americans. Being in partnership with the government Russian interests, no doubt, will be favored in future developments.

In Hungary a similar course has been followed. The only important producing field in Hungary, at Lispe, was developed by the Hungarian-American Oil Co. (an affiliate of Standard Oil Co. (N. J.). It was taken over by the government after the start of the war. Production rose from 200,000 barrels pre-war to 6,000,000 in 1944 and is now proceeding at a reported rate of about 17,500 barrels daily under Russian management, the bulk of the oil going to the Soviet Union on reparations account.

In Hungary a company called Sovmagnafta has been formed under joint Soviet and Hungarian ownership. Hungary contributes to the company the assets of all Hungarian oil concerns and agrees to deliver to it 15 percent of all oil produced by foreign owned companies. The company is under Russian management.

Development of new fields in Austria during the war greatly increased its oil production which rose from 400,000 barrels in 1938 to nearly 8,000,000 in 1944 and then fell to slightly less than 4,000,000 in the following year. The Germans controlled all operations during the war and by forced purchases acquired nominal ti to about half the country's production. The Russians regard these German held properties as war assets and assert that they should be treated as such. In accordance with this position they have taken out of the country a large quantity of drilling and producing equipment. As in Romania and Hungary the Russians have proposed the formation of a company which would be owned in equal shares by the two governments.

Through annexation of eastern Poland the Russians have come into possession of the Galician fields which are responsible for all but a fraction of Polish oil production which before the war amounted to about 2,500,000 barrels. Incorporation of Esthonia in the Soviet Union adds to Russian resources the shale oil production of that country amounting to approximately 1,500,000 barrels. In the Pacific area Russia now has possession of the entire island of Sakhalin the oil from which formerly went to Japan under a Russo-Japanese agreement. From all these varied sources the Soviet Union is now obtaining something like 40,000,000 barrels yearly which apparently is just about sufficient to bring its total supply up to the pre-war level.

Considering the extensive program on which Russia has embarked for restoring its devastated areas, building a great system of highways, enlarging the production of food by greater use of mechanized farm machinery and resuming the industrial expansion interrupted by the war it appears reasonable to assume that the oil being obtained

Russian Prospecting is Active in the Arctic. Test Pictured is on Cape Hardwick on an Inlet of the Arctic Ocean. Sovfoto.

from outside sources will be readily absorbed within the country's own borders and will be no more than sufficient to fill the gap between supply and demand until the expansion of domestic production can get fully under way. Export of oil, except to serve some special purpose, would seem unlikely for the near future.

While endeavoring through the establishment of commercial associations such as those heretofore described to acquire a direct interest in oil production in neighboring countries Russia is not neglecting the development of its own extensive resources. As soon as the Russians regained possession of the areas devastated by invasion, work was started toward their restoration. New drilling to revive the flagging production of older fields like those of Baku was put under way and an intensification of exploratory work in widely separated parts of the country was undertaken.

Orders for several hundred drilling rigs were placed in the United States and other contracts for millions of dollars worth of producing and refining equipment will follow completion of loan arrangements now under discussion in Washington. Plans for the more extensive manufacture of oil equipment in Russia are part of the recently completed plan for the next five years. In the speech of N. A. Voznesensky, chairman of the State Planning Commission of the Soviet Union, outlining the program for the current five year plan the following objectives were laid down for the petroleum industry:

To bring about a speedy reconstruction and development of the oil industry as a whole so that the pre-war rate of production and refining of oil may be reached in 1949 and surpassed in 1950;

To continue the many sided development of the oil industry, including prospecting, production and refining, in the following areas: Eastern Bashkir Republic, Sakhalin, Uzbek Republic, The Urals, Volga Areas, Turkomen Republic, Kazakh Republic and Ukrainian Republic;

To increase the importance of the Eastern areas of the U.S.S.R. in terms of the total output of oil in the country;

To provide means for speeding up the reconstruction of and expansion of oil production in the areas of the Caucasus, Baku, Grozny, and Krasnodar;

To develop and expand geological research and develop geological exploration in order to locate new oil bearing areas to meet the plan as set for 1950; and, to have located by 1950 adequate oil bearing areas to meet the industrial needs of the U.S.S.R. for the next two or three years following the end of the plan in 1950;

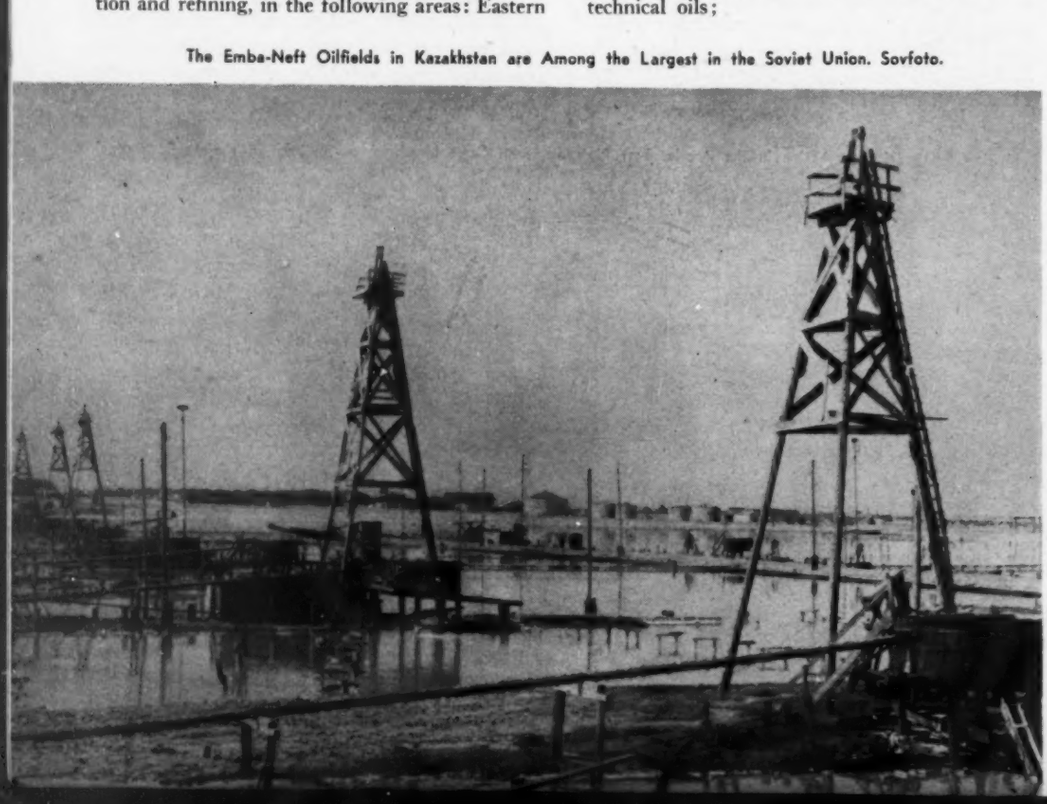
To provide for a general increase in wildcat and exploratory drilling and raise the importance of this type of drilling operations in relation to the general volume of drilling work;

To develop speedier methods of drilling wells and also faster methods of rotary drilling and also to re-equip drifting wells with better production equipment; and to supply better secondary methods of oil recovery; to develop methods of oil recovery by the sealed hold and compressed air method and also to improve methods of handling crude oil at the well and its transportation;

To develop the production of high octane aviation gasoline and to raise the quality of automobile gasoline, tractor kerosene, diesel fuel and oil products generally;

To increase the yield of refined products from crude petroleum by reducing refining losses and by the wide application of foreign processes and technique and generally through the use of the most advanced methods of refining gasoline and technical oils;

The Emba-Neft Oilfields in Kazakhstan are Among the Largest in the Soviet Union. Sovfoto.



To construct during the five-year period four new oil refineries and 16 extensions to existing refineries, to reconstruct three oil refineries in order to supply the rural and industrial areas of the south with oil products;

To construct new trunk oil pipe lines;

To create a large industry for the manufacture of lamp black from natural gas by enlarging existing plants and constructing new ones;

To reconstruct and enlarge extensively the oil machinery and equipment manufacturing industry; also to augment the manufacturing capacity for producing instruments for the oil industry. In specific terms the oil industry is called upon to raise production to 247,000,000 barrels by 1950 or 13.6 percent above the 1940 output. This is in accordance with the general plan outlined in the Voznesensky report. Special emphasis is to be put on the enlargement of output of eastern fields which are expected to triple their pre-war outturn by 1950. To facilitate progress in these newer areas two oil commissariats are established, one embracing the older districts of the Caucasus and the western and central regions; the other will include the Volga and Ural districts and the territories to the east of the Urals and the Caspian in which evidences of oil have been found and in some of which substantial production has been developed. Aside from the enlargement of oil production special efforts are being directed to the production and distribution of natural gas and also to the creation of a synthetic fuel industry.

This is an extensive program but it is to be observed that the goal set is a moderate one, that is to raise production and refining merely to the pre-war level by 1949 and to exceed it only in 1950. Furthermore, the industry is asked merely to locate by 1950 production adequate to meet the industrial needs of the country for the ensuing two or three years. In line with this realistic proposal was the speech made earlier by Premier Stalin who laid down as a production goal for 1960 430,000,000 barrels as compared with 217,000,000 in 1940, an increase of 98 percent which is less than the percentage gain demanded of other mineral industries.

Of all the post-war moves by the Soviet government in the matter of oil the one that has aroused most discussion in the press and official circles has been the demand for an oil concession in Iran, which was pressed with such insistence while Russia was in the advantageous position of having large armed forces in that country that it led to an agreement in April of this year granting to a Soviet controlled society to be later organized, exploration and exploitation rights in a tract extending across the northern part of Iran adjoining the territory of the Soviet Union from Afghanistan to a point within fifty miles of the Turkish frontier.

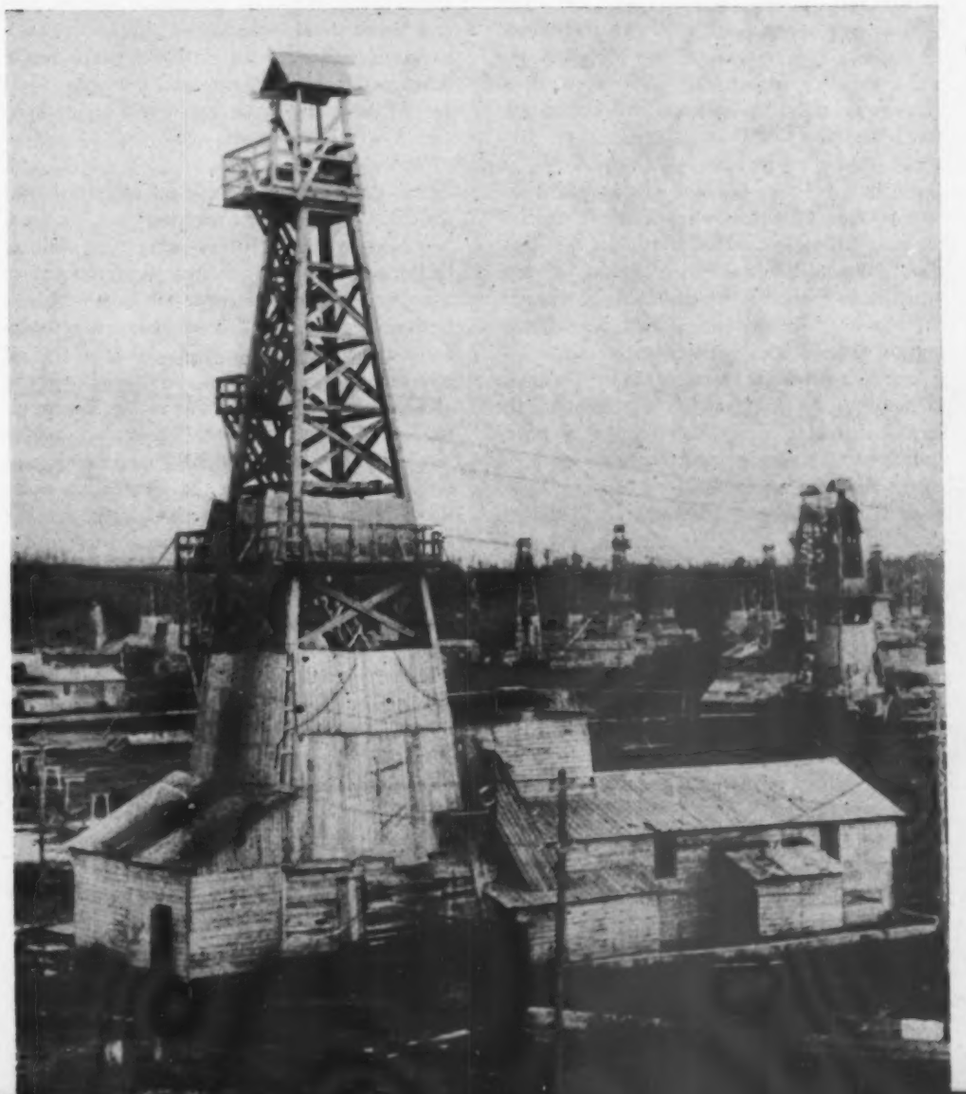
Significantly the agreement provides that within the fifty mile strip adjoining Turkey no concession shall be granted to any foreign owned oil company or any Iranian company in which foreign capital is represented. During the first twenty-five years of the concession period the Soviet Union is to hold 51 percent of the shares of the operating company and the Iranian government 49 percent. During the second half of the term the ownership is to be held equally. The actual organization of the company was deferred pending approval of the agreement by the Iranian parliament which is required within seven months after the date of signing. While this action by the Soviet Union has been variously interpreted as the start of a drive to extend its influence through the Middle East and as a move to engage in large scale oil development outside its own territory men who are well informed regarding Russian oil policy look upon it as dictated by political rather than economic motives and believe it is regarded by the Russians themselves as a defensive rather than an aggressive measure.

A primary feature of Soviet policy since the end of the war as evidenced by the course followed in eastern Europe has been the creation of a security belt around Russian borders in which support is extended to friendly governments and Soviet commercial interests are established as a means of guarding against economic dominance by foreign capital that might conceivably be antagonistic. To those acquainted with the attitude prevailing in official Soviet circles it is readily understandable that Russia might object to having foreign owned oil companies as neighbors along its southeastern border and in close proximity to its most important oil fields and so might consider the acquisition of a controlling position in this area as an integral part of its security wall. In other words, the desire to keep others out might have seemed as important to the Soviet authorities as the winning of the concession for themselves.

This is not to say that the concession will not be worked. Undoubtedly exploration will be carried on and if successful will be followed by development of such resources as may be discovered. Whether oil can be found in the area can only be determined by the test of the drill although the location of the concession between the great Russian fields around the Caspian and the prolific districts further south in Iran is considered a favorable one, particularly the section lying south of Bandar Shah southeast of the Caspian where the concession area projects furthest southward. If oil is found its natural outlet is to the north where water transportation is at hand for its distribution and the necessity for a long and costly pipe line is avoided. This advantage of position has been recognized by international oil companies that might have been candidates for concessions in this region and they have interposed no opposition to the grant to the Soviet Union.

Oil Has Been Found on the Amga River in Yakutia Within the Arctic Circle. Sovfoto.

View of the Okha Oilfields on Sakhalin Where Russia Has Increased Oil Resources Since the War with Japan. Sovfoto.



Members of the Revolutionary Government Board, from Left to Right: Dr. Luis B. Prieto, General Secretary, Dr. Raul Leoni, Minister of Labor, Major Carlos Delgado Chalbaud, Minister of War and Navy, Romulo Betancourt, President of the Board, Major Mario Vargas, Minister of Interior Relations, Dr. Edmundo Fernandez, Minister of Health and Social Service, Dr. Gonzalo Barrios, Governor of the Federal District.

VENEZUELAN OIL POLICY MAY AFFECT WORLD SITUATION

By RUTH SHELDON

CARACAS

THE international oil spotlight is focussed sharply on Venezuela where precedent setting events are taking place with repercussions that may be felt politically and industrially throughout the world.

Developments in varied but interlocking fields have piled up at a rapid rate. Venezuelan labor has emerged as a powerful factor in the situation. New oil history is being made by government plans to sell its royalty oil in a competitive market. Russia, for the first time, is taking an active interest in Venezuelan oil. The reported impending invasion of the Western Hemisphere by Arabian oil is prompting the formulation of a Venezuelan foreign oil policy and the Venezuelan government may become a potent force in international oil affairs. Venezuela is displaying an active interest in the examination of oil profit distribution and contemplating a revision of existing formulas. Furthermore, the government has in its mental background some ideas on active government participation in refining.

These developments cannot be dismissed as a new revolutionary government's first radical actions which will diminish in force and change in goal. The revolutionary government has simply taken the cork out of the bottle and the things which are flowing from it reflect changing social and industrial conditions that are not local but are exerting influence everywhere.

Of primary importance at the moment is the Venezuelan labor problem. Flames from the labor conflagration which burned so fiercely in the United States during the past few months leaped across the Gulf of Mexico and for several tense weeks threatened to result in a nation-wide Venezuelan oil strike which would have paralyzed the national economy while acutely increasing the present world crude shortage.

Fortunately, neither the companies, government or labor permitted the situation to reach a deadlock and by adroit maneuvering were able to find a sufficiently large area of agreement to avert a tie-up and to serve as the basis for a collective labor contract now under negotiation between the petroleum syndicates and the oil companies to continue in effect until the end of December, 1947. Attainment of this result will stand as a remarkable accomplishment in view of the peculiar national and international factors which complicate the Venezuelan situation. These involve so much potential conflict and so many abnormal conditions that the dispatch with which the fundamental accord has been reached and the reasonableness of its terms are surprising.

Although it is obvious that labor will make greater demands upon the termination of the contract, the real virtue of the present accord is that it solves the labor problem satisfactorily for the time being and provides a year and a half to elapse before re-examination. During that time present economically unbalanced world conditions should have stabilized sufficiently to permit a more accurate appraisal and solution of the labor-management problem everywhere which will be reflected in the Venezuelan approach to its own situation.

Principal gains granted the workers are: permanent inclusion in base pay of the Bs2 (60 cents) daily wage increase granted last year to meet increased cost of living; daily wage increase of Bs2 (60 cents) for all workers (their demand was Bs4, $1.20); salary increases of from three percent to 15 percent for employees; 56-hour pay for a 48-hour week; full pay for traveling time to and from work exceeding 15 minutes; sick pay; 15 days vacation with pay for all workers; workers for contractors or subcontractors of the companies to receive same pay and benefits as oil workers. Numerous other benefits are granted covering betterment of living conditions, savings funds, scholarships, industrial schools, life insurance, company commissaries and hospitals.

Estimates of the additional cost of this agreement to the companies vary from Bs40,000,000 to Bs110,000,000 annually ($12,000,000 to $33,000,000). The companies estimate that the settlement represents from 35 percent to 50 percent increase in wages for Venezuela's 25,000 oil laborers of all classes out of a total of 30,000 workers in the industry.

From the oil company viewpoint, the most satisfactory part of the settlement is the exclusion of all demands encroaching upon management's freedom of operation. For example, the laborers demanded that upon syndicate request the companies would be obliged to remove any official whose actions, in the syndicate's opinion, "did

not guarantee the harmony which ought to exist between labor and management." There was no argument on this particular contract clause as the management bargaining committee simply suggested that to be equitable it should be amplified. It should include the provision that upon company request the syndicate would be obliged to remove any of its officials whom the company considered were not contributing to harmony between labor and management. The labor leaders suggested that the matter be dropped completely.

The oil companies approached negotiations with considerable anxiety. Conditions were far from favorable from their viewpoint. Chaotic strike conditions in the United States strengthened the Venezuelans' labor attitude. The revolutionary government of Venezuela, which assumed power last October, is a pro-labor government and is seeking to increase its political strength throughout the country so that it will be in a favorable position for the forthcoming elections to choose a Constitutional Assembly and subsequently to select a President by popular vote. The oil workers form a powerful bloc of members of the government party—the Accion Democratica. Consequently, there appeared little likelihood that the government would or could exercise any restraining influence on the oil workers.

The government, however, did assume a definite position as mediator during the negotiations. It brought pressure to bear upon both the companies and labor to reach a compromise before the strike deadline and the agreement was signed in the office of the Minister of Labor, Dr. Raul Leoni. The announcement of the accord was dramatically made by the president of the Revolutionary Government Board, Romulo Betancourt, as the opening note of a long-scheduled speech on Venezuelan economic problems before the Chamber of Commerce which was broadcast throughout Venezuela and Colombia. President Betancourt told the audience, "By the wisdom and good-will of the contracting parties, it has not been necessary to enter into one of those strikes which are disrupting the economies of the great industrial countries."

Satisfaction over the settlement was somewhat marred by the statements and attitude of the oil syndicates. Luis Tovar, president of the oil workers' federation, declared immediately following the signing of the accord, "We have gained many million bolivares but the fight isn't over. We must obtain all the demands in our petition and take the petition as a battle program." The oil companies had already had experience with that petition, as it was in great part drawn clause for clause from the Mexican labor petition which resulted in the 1938 expropriation of oil properties in that country. Some of the Venezuelan clauses followed the Mexican demands so precisely that they were even worded in Mexican Spanish rather than Venezuelan Spanish.

Romulo Betancourt, President of the Revolutionary Government Board.

Dr. Juan Pablo Perez Alfonso, Minister of Fomento.

The government, however, is aware of its responsibilities to both the oil companies and the workers. The government policy and viewpoint is admirably expressed by Dr. Juan Pablo Perez Alfonso, a brilliant young law professor and former Congressional deputy who is now Minister of Fomento. He defines government policy as "keeping close watch on the relations between workers and companies, but with consideration of the liberties which belong to each."

"Recognition of the petroleum workers' legitimate right to reasonable living conditions which industry profits allow must be considered a just national desire," he says, "I consider, on the other hand, that, if the Venezuelan people as a whole aspire to retain in the country a just proportion of the profits from exploitation of natural resources, it is not the best method to give this participation in unlimited remunerations to that portion of the population economically tied to the exploitation of the resource. The reasonable way of just distribution is the financial discernment which a popular government will necessarily exercise in the form most adequate for the general welfare. The other method would create a privileged group, a permanent source of conflict as the unfavored population would constantly be trying to displace the favored. The oil worker must receive a salary and other advantages, enabling him to live decently, and perhaps somewhat better than his fellow countryman. But anything else would be unacceptable."

The government preference for directing additional benefits from the oil industry to the national treasury rather than to make them the possession of any special group of the people, is based upon the fact that oil is the chief factor in Venezuela's economy and must be dealt with in the interest of all rather than a few.

The revolutionary government is not completely satisfied with the present distribution of industry profits. The 1943 Venezuelan oil law represented an increase of 70 percent of oil revenue from royalty oil to the government and the oil companies considered, at that time, that a maximum readjustment of profit division had been made. When the present government came into power in October the oil companies were apprehensive about their status as President Betancourt and Minister Perez Alfonso had been opposition leaders against the passage of the 1943 law on the ground that it did not permit the government an equitable participation in times of extraordinary profits. The government assured the companies that it had no intention of invalidating the 1943 law, but it promptly proceeded to give effect to its earlier objections.

Oil executives awakened on New Year's Day with a real hangover as the government on December 31, 1945, issued a decree placing an extraordinary tax on all 1945 profits. This was applicable to everyone in Venezuela, but it caught the oil companies in the 20 percent bracket making their share of the Bs100,000,000 ($33,000,000) due approximately Bs90,000,000 ($30,000,000). As they say in Venezuela this was "una ley con nombre y apellido" or to translate freely "a decree with address and telephone number."

President Betancourt summed up the government position in the important speech to the Chamber of Commerce mentioned above. "This decree was dictated," he said, "taking into account various circumstances, among them that Venezuela is one of the few countries in the world which does not have an excess profits tax; the other was that the companies affected most, the oil companies, one of whom has to pay $16,000,000 and has paid its first quota, had obtained profits which did not correspond to the terms of the 1943 agreement." He commented that the present government which was then the opposition, had criticized the method of figuring government profit and their criticism was supported by the actual income returns of the companies for 1944 and 1945 which showed that

the companies received far more profit than the government. This, he concluded, "explains why the companies did not question the justice of the tax."

While the oil companies did not campaign publicly against the decree as there were no legal grounds upon which to do so, they protested verbally to the government, but purely upon "moral" grounds. In commenting upon the excess profits levy, however, Minister Perez Alfonso says, "The government has formally declared that it will not resort to new taxes. However, it appears reasonable to me to think that the constitutional government, elected by popular and direct vote, which is awaited by all Venezuelans, necessarily must study for Venezuela, as is being done everywhere, an excess profits tax which will prevent exaggerated exploitation of the people and their natural riches. As Mr. Bernard Baruch recently said, we must "allow profit but no profiteering."

Minister Perez Alfonso carefully points out that the government's objection to the 1943 oil law is not because it is not a good law but because it is not good enough in some respects. His argument is that while it provides on the one hand that government royalties may be reduced when a property, due to increased costs, cannot operate economically under the royalty burden, it does not provide for the counterpart of that concept, that in times of extraordinary profit, the government should share proportionately.

The 1943 law was figured on the division of profits under existing price and cost conditions, which represented approximately a 50-50 participation for government and industry. If market prices increase and costs remain the same, the government maintains that the companies receive greater profits on their 5/6 of the oil than the government on its 1/6. A fixed percentage royalty allows for government benefit in increased volume but not in a correspondingly equitable participation in benefits from increased prices. An excess profits tax provides for a readjustment of those values, but the government would prefer to see such a provision incorporated basically in the petroleum law.

It is certain that the quest for the perfect formula for the equitable division of profits between the governments who own the subsoil and the private companies which exploit it is no more at an end in Venezuela than it is elsewhere in the world.

Another indication of the Venezuelan government's dissatisfaction with the existing formula is that for the first time in oil history a government is seriously negotiating to sell its royalty oil in the open market. Heretofore all governments owning the subsoil riches have taken cash for their royalty oil from the exploiting companies and have confined themselves to negotiating with those companies the proper basis upon which the value of the royalty oil should be estimated.

From time to time when there are world crude oil shortages independents or groups have proposed to various governments that they be allowed to purchase royalty oil. The governments have been reluctant to consider such propositions as they did not wish to upset their long-term arrangements with the companies actually producing the oil.

The present Venezuelan government, however, with its conviction that the government should participate whenever possible in unusual profits, is considering signing a definite two-year contract, which the 1943 law provides for, to sell one-third of its approximately 166,000 barrels per day of royalty oil to D. D. Feldman, a Dallas, Texas, oil operator. Feldman's offer is to take not less than 20,000,000 barrels a year at a price which shall not be less than the government is now receiving from the exploiting oil companies. (This price is figured to compare at the Venezuelan field with that of West or East Texas crude in the field, depending upon the gravities involved, at the Gulf Coast). Feldman offers to divide equally with the government any profits which he may make in the sale of the oil above that price, or if any of the oil is used in a refinery in which he may have an interest, direct or indirect, the government will be guaranteed a five cent per barrel profit.

It is reported that Feldman contemplates tying in with an independent group in the States that would like to buy the Big Inch pipeline and transport Venezuelan oil to refineries in the interior. This arrangement, of course, is highly speculative as no decision has been made by the United States government as to the disposition of the Big Inch. If it is sold by the government it will more likely be used as a gas line than for the transportation of crude, due to many obstacles that have been pointed out to its successful use as a crude oil line.

Feldman is also negotiating with the Colombian government to purchase its government royalty oil, but in this case the proposal is to refine the oil, approximately 9,000 barrels daily, in Colombia, in a refinery to be equally owned by the government and the Feldman group.

The Venezuelan government pursued an unusual course in regard to the royalty oil proposition by inviting the comments of the press, public, oil companies and the other Venezuelan political parties. The oil companies are noncommittal, as is to be expected, since the law provides for just such action. Such a sale would mean a readjustment of their production program in order to meet their own commitments in which the volume of royalty oil is now included.

The general reaction of the Venezuelan public and political parties is favorable with one major exception. The present proposal does not guarantee any additional profit to the government but merely agrees to divide any speculative profits. A large segment of Venezuelan public opinion believes that if the government enters into such an agreement its profit should be guaranteed.

Minister Perez Alfonso states "We contemplate the operation as an experience which permits a different policy of utilizing our share of oil production. It is regarded as an experience looking toward the establishment of mixed company refineries, and even producing oil in association with companies and not by means of ordinary concessions, which as has been proved by experience since 1943 does not guarantee in every case a just participation of the State in the natural wealth which is the core of the country's economy."

That the government would like to see a government-private enterprise refinery in Venezuela is indicated by the recent experience of Creole (Standard Oil Co. of New Jersey subsidiary which controls approximately 54 percent of Venezuela's 1,000,000 bbls. daily production). As a result of the 1943 oil law negotiations Creole agreed as did several other companies, to build a refinery of 50,000-bbl. capacity in Venezuela before 1951 or as soon as it was possible to obtain materials. When a refinery site was being picked, the former government asked that Creole consider the port of Turiamo, on the Caribbean coast, almost mid-way between the eastern and western oil fields, as the government was anxious to see that area built up. Creole entered negotiations with the government for the land, which was federal property. The government continued these negotiations, but pointedly suggested that the government land should be used as a site for a refinery in which the government should participate equally with the company. Creole, which does not like mixed companies, immediately ceased negotiations. It plans, as does Shell, to place its refinery on the Paraguana peninsula which extends from the entrance to Lake Maracaibo, in and around which lie the great western fields.

These internal changes and the shifting of emphasis of the government approach to Venezuelan oil problems are of world interest in their possible influence on the oil thinking of other countries. The reasons for American and British concern are obvious. Nor is Venezuela's importance in the world oil picture escaping Russian attention. Russia has sent as her ambassador to Venezuela Dr. Fona A. Trebin, a petroleum engineer and geologist who was a high official in the Russian government oil organization. With his technical training there is no question that the Russian government will be accurately informed as to every phase of the Venezuelan oil situation. In addition Dr. Trebin has a very ingratiating personality and has made an extremely good impression in Venezuela.

Russian influence upon Venezuelan political thinking—oil or otherwise—is not an issue at present, however. The Venezuelan Communist

(Continued on page 60)

Seated, from Left to Right: Counsellors Dr. Mario Leao Ludolfo (Representative of the Industry), Lieutenant Colonel Artur Levy (Representative of the Army), Geologist Avelino Ignacio de Oliveira, Member of the Executive Commission (Representative of the Department of Agriculture), General Joao Carlos Barreto (President), Dr. Aluizio de Lima Campos (Representative of the Department of Finance) and Commander Bertino Dutra de Silva (Representative of the Naval Department). Standing, to the Left: Captain Julio de Paiva Neiva (Official of the Cabinet) and to the Right: Milton de Lima Araujo (Director of the Cabinet).

Brazil Looking to Accelerated Oil Development

ASIDE from purely scientific and geological studies, the history of petroleum in Brazil begins with the year 1935 when the government established a geological and mineralogical service which, besides interesting itself in mineral production, began to look for petroleum. The first efforts in this direction were made in areas contiguous to the frontiers of Bolivia, Peru, and Argentina, in which countries oil was being produced.

Exploratory work was later started along the northeastern coast of the State of Rio Grande del Norte in the vicinity of Bahia. In 1935 a number of holes were drilled in the region of Cruzeiro do Sul, in Acre, in Maceio in the state of Alagoas and in the Reconcayo district of the Bay of Todos Os Santos.

About this time the government decided to create a body which would specialize in the search for petroleum and the present Conselho-Nacional do Petroleo (National Petroleum Council) was established for this purpose. The first act of the new authority was to contract the services of American experts in oil geology, drilling and geophysical exploration. During the period 1939-1942 seven wells were drilled at various points in Alagoas, five of which were dry, while two made a showing of oil; the total footage of these wells was 42,630 feet.

This work in Alagaos proving unsatisfactory, the Council centralized its operations in the Bahia region. Early in January, in Lobato, the Council drilled its first producing well. Subsequent work led to the drilling of four other producing fields in the Reconcavo district of Bahia, with a combined potential capacity of 2305 barrels a day. These four new fields were named the Joanes, the Caudeios, the Aratu and the Itaparica. The production of these fields was refined in two small experimental refineries, each with a rated capacity of 150 bbl/day and has been used by the Council in its drilling operations and by local factories engaged on government work.

Up to September, 1945, the production of three fields had totalled 210,009 bbls. The Candeios field is supposed to have a reserve of 4,660,000 bbls. The Aratu field has a reserve of about 70,000 bbls. and a gas reserve of a billion cubic meters. The total reserves of the Bahian fields have lately been estimated at 12,120,000 bbls.

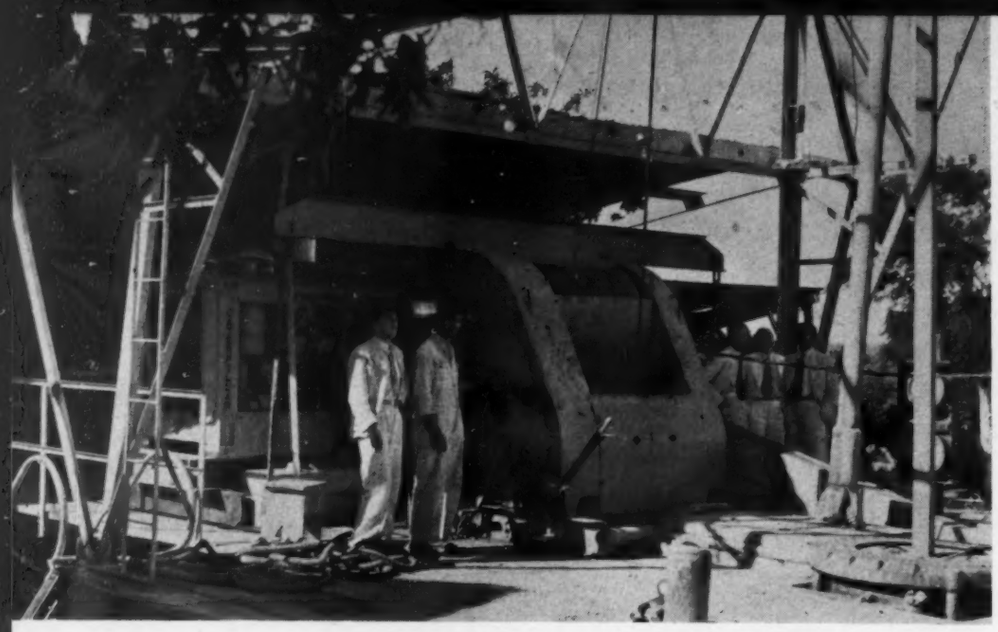
According to a summary published in A Manha of April 7, 1946 the actual results to date of Brazil's effort to establish a domestic source of petroleum are represented by 27 producing wells with a potential of 2200 bbls. and an actual average production of 1300 bbls/day.

The definitely proved oil-bearing area, according to the same authority, is 485 to 607 hectanes (1196 to 1499 acres). Of the existing fields the Aratu has seven and the Itaparica six gas wells. Up to September, 1945 some 75 wells have been drilled with a total footage of 220,125 feet in the producing fields and 32,652 feet as wildcats on seven neighboring structures. At last accounts the Council had at its disposal 10 modern rotary drilling rigs, which are to be increased as material becomes available.

It is not considered that the relatively small success of operations to date is a measure of the real oil resources of this large country. As long ago as 1938 one of Brazil's ablest experts, in collaboration with a number of other experienced geologists, computed the potential oil territory at 2,335,850 square kilometers, which is the equivalent of 27.4 percent of the entire Brazilian area. Narrowing their estimates down to territory of greatest immediate interest they see fair prospects for oil in a total area of 492,650 square kilometers.

With these wide but indefinite prospects before it, in 1945 the Council contracted for the aerial mapping of about 30,000 square kilometers north from Reconcavo to the city of Jeremoabo, and made a contract with the Schlumberger interests for electrical surveys by their method. Geological studies are currently being made in a search for favorable structures in the belts of sedimentary rocks in the north of Salvador, comprising the areas of Nova Soure, Cipo, Tucano, Ribeira do Pombal, Cicero Dantes and Jeremoabo.

The North American geologist E. L. Golyer was commissioned in 1944 to make a survey of likely areas. After an extensive reconnaisance a plan



Drilling rig at Aracaju, Brazil.

for continued studies in the Bahia region was submitted which would extend to the north through Sergipe and Alagoas up to Recife, and to the south through Marau and the area of the Cape of San Thome.

Another American geologist, Lewis W. MacNaughton, was engaged the same year to head a study of the Parana basin. After working over parts of the States of Sao Paulo, Parana and Santa Catarina the MacNaughton Commission submitted a report pointing out the existence of a belt of sedimentary rocks adjacent to the Serra Gerol scrap and extending from Sao Paulo to Rio Grande do Sul. They selected two areas worth especial study, one in Sao Paulo and the other in Parana.

On the basis of the geological and geophysical studies thus far made the Council has formulated a program which will be developed in the next few years and will involve the following regions:
I. The coastal sedimentary belt between the States of Espirito Santo and Rio Grande del Norte;
II. The Maronhao—Piaui basin
III. The delta of the Amazon and the basins of the lower and middle Amazonas
IV. The Amazonas — Acre region;
V. The Parana basin
VI. The Alto-Araguaia basin

It is the intention to initiate, in 1946, geophysical prospecting in the delta of the Amazon and the lower Amazonas basin, and to make a geological study of the Maranhao—Piaui basin.

In the meantime, new equipment is now on order in the United States and it is expected that with the help of the new facilities the production of the present known producing areas can be stepped up to around 8000 bbl/day or more. It is conceived that in a few years these oil fields will be producing about 25 percent of the country's need for petroleum products. To help further to improve its oil position Brazil is now extending its railroad system to connect with the oil regions of Bolivia.

However, the Council is awake to the fact that its task is to develop a Brazilian industry that will fully meet the nation's requirements for this vital raw material. Its task has been made difficult, especially as regards the time element, by the national laws which prohibit the entry of foreign capital into the business of exploring for oil, or for engaging in the refining of crude petroleum in the national territory. The Council has under study a proposition to modify this situation, but it admits that there is no great prospect of success in the immediate future. It is acknowledged that the Brazilian government has only to let down the bars, and American venture capital would immediately put its weight into the search for petroleum along with native capital. For instance, the Council has had before it for sometime an offer by the Standard Oil Company of New Jersey to invest Cr $200,000,000 in a search for oil over a period of ten years.

As the matter now stands any citizen of Brazil or any Brazilian corporation may obtain a concession to explore for oil on a selected area of 10,000 hectares (24,700 acres), two such concessions per person being the limit.

Very little native capital has taken advantage of this opportunity and searching for petroleum has heretofore been done almost exclusively by the Council with government funds. The lack of interest on the part of native private capital is ascribed to the large element of risk and to the large investment required for thorough exploration of a single 10,000 hectare concession.

The cost of exploring such a concession has been officially computed on the basis of the Council's experience in the Bahian Reconcavo since 1939. Up to date the Council's operations in this region, which have included geological studies, geophysical prospecting and the drilling of exploratory and producing wells, have required the spending of Cr $250,000,000 (in round figures) which, figured on the whole area covered, breaks down to Cr $650 per hectare for strictly petroleum operations. On this basis, the possessor of a 10,000-hectare concession can expect an average cost of Cr $650,000 for which he may find a duplicate of one or other of the four small fields opened by the Council. It is admitted that this is a large amount of capital for private individuals to risk in an uncertain venture.

In a memorandum handed up to the President of the Republic, the President of the National Petroleum Council, Gen. Joao Carlos Barreto, observes that since the Bahian fields have opened some prospect of a real petroleum industry, there is hope that the heavy burden laid on the public treasury by the search for petroleum may be more or less eased if exploration is continued with the necessary energy. However, Senhor Barreto makes the point that in view of an alternate possibility it is not right that only the government should bear the responsibility of this work. Since it is admitted that present Brazilian law prevents the acceptance of participation by foreign capitalists in these activities, the government should arrange matters to give native capital the incentive it now lacks.

This stimulus to native capitalists is expected to be found in the following circumstances, which are found to exist in the great North American petroleum industry. While the business of prospecting for petroleum is, in the words of the American geologist DeGoyler, an expensive adventure, the business of refining crude petroleum does not have this character. The operator of a petroleum refinery has everything ready to his hand. He can make an exact study of the economics of his refinery, even if he has to work only with a source of foreign crude oil. Like any other manufacturer he knows the extent of his market, the price he is likely to obtain, and the cost of his raw material. If his business turns out to be profitable, it will be quite natural for him to set aside a part of his profits with which to prosecute a search for new sources of the raw material, which, if discovered, will confer new profit on his enterprise. Such, it is argued, has been the case with the large North American petroleum operators who produce petroleum from their fields, refine it, and from the proceeds of the sale of the products pay dividends and have enough left over for new exploratory work, thus swelling their incomes and enlarging their profits.

With this in mind the Council in a resolution dated October 1, 1945, opened the way for Brazilian capital to establish oil refineries to work on imported crude oil in an amount which, in the limit at present contemplated, would require an investment of up to Cr $150,000,000

which would yield an estimated gross profit from the operation of these refineries amounting to about Cr $56,000,000. Preference would be given to applicants for refinery concessions who would agree to invest a portion of their liquid profits in a search for native petroleum deposits. The Council figures that if the proportion reserved amounts to 25 percent, less certain obligatory deductions, it would afford an annual net of Cr $12,000,000 for oil prospecting, or enough to do effective work on an area of about 20,000 hectares (49,400 acres). This may be compared with the above mentioned offer of the Standard Oil Co. (N.J.) to spend Cr $20,000,000 a year in prospecting for oil over a period of ten years.

From an economic study of the existing Brazilian market and its trends, the Council is of the opinion that by the time the projected refineries come into operation, the demand will still be in excess of what these refineries will then be producing.

The resolution adopted on October 1st, 1945, and approved by President Vargas, lays down the following terms for the establishment of petroleum refineries by private Brazilian capital. Preference will be given to applicants for refinery concessions who will agree to set aside a portion of their profits for exploring Brazilian territory for new oil fields. These refineries will at first operate on imported crude oil.

The Council reserves the right, at any time, to require the operators to install new or improved processes that will tend to raise yields. In each economic district of the country the number of refineries will be limited, both as regards capacity and localization, to correspond to the consumption requirements of the districts. The concessions will be apportioned with a view to avoiding the preponderance of a single financial group in the market.

Before applying for a concession the applicants must exhibit an agreement with foreign producers to supply them with crude oil over a period of at least five years. No consideration will be given to applications for tariff or tax exemptions. Preference will also be given to those who offer to maintain the largest stocks of crude

The prices of the products produced by the Brazilian refiners will be regulated according to the prices of similar foreign products on a basis established by the Council.

Proposition which have been tentatively accepted by the Council include offers by interests headed by the following individuals: Aristides de Almeida, of Sao Paulo, for a capacity of 10,000 bbl. a day.

Alberto Soares de Sampaio, of the Federal District, for an initial capacity of 8,000 bbls. to be later raised to 10,000 bbls. if market conditions warrant.

Drault Ernmany de Melo e Silva, in or near the Federal District, under the same conditions as offered by Alberto Soores re Sampaio.

Edgar Raja Gabaylia, in the state of Sao Paulo, 6,000 bbls. a day. These latter interests are said to have contracted with a Mexican source for a five year supply of crude.

Applicants are required to post a bond of Cr $500 per bbl. of capacity, to be vacated after 12 months of normal operation. Stock transactions of the concessionaires are to be strictly controlled and they must render detailed operating and financial accounts. The concessionaires are allowed to spend their contribution to the exploratory fund in searching for oil on their own account, or they may pool their reserves for a joint search as agreed with the council;

General Joao Carlos Barreto, President of the National Petroleum Council of Brazil.

any oil found will be prorated among the cooperators. This arrangement is to last until production from national sources is equal to the national demand.

On his return to Rio de Janeiro from a trip to the Bahia section Colonel Joao Carlos Barreto, president of the National Petroleum Council, stated that the oil reserves in that region are now close to 12 million barrels and are considered sufficient to justify construction of a refinery with a capacity of 2500 bbl. daily and that attention is now being directed to such an installation. The refinery would be for local use and a related project contemplates the distribution of natural gas from the gas fields in that region for which there is a demand from industrial plants. Reference also was made to refineries planned for construction in the Federal District and in Sao Paula which would operate in imported crude.

Atlantic Refining Company Terminal, ay of Rio, Brazil.

WARREN PLANS EXPORT DEVELOPMENT

WITH an eye on expanded world markets for natural gasoline and liquefied petroleum gases, Warren Petroleum Corp. of Tulsa, has purchased the six E. I. Hanlon companies, also of Tulsa, to become probably the world's foremost major independent and non-integrated manufacturer, marketer, transporter and exporter of light hydrocarbons. The enlarged company has deep-water terminal facilities with large pressure storage capacity at four Texas ports, one Louisiana port and one Pennsylvania port. Storage at each port is sufficient to load cargo lots of natural gasoline for the export and coastwise trade. It is no secret that the Warren management intends to develop the export phase of the business far beyond that which either company had transacted before the war interrupted natural gasoline exports.

Some of the Warren storage at seaboard terminals is supplied by pipeline direct from company plants or from plants under sales contracts. In addition Warren markets the output of a number of plants in prolific Gulf Coast fields within easy hauling distance of tidewater.

The purchase of the Hanlon companies meant that Warren, founded 24 years ago on a natural gasoline sales idea and the $300 savings of W. K. Warren, then a 25-year-old office employe of an oil company, has grown into a $25 millions corporation holding top position in its particular branch of the petroleum industry.

It also means the withdrawal of E. I. Hanlon from active participation in the natural gasoline industry after having pioneered in the construction and operation of natural gasoline plants. Mr. Hanlon was building plants in West Virginia by 1908, only two or three years after the then crude process for extraction of natural gasoline from natural and casinghead gas first was discovered.

For the reported $12,000,000 purchase price the Warren Corporation obtained all of the outstanding capital stock of Heneghan & Hanlon Inc., Hanlon-Buchanan, Inc., Hanlon Gasoline Corporation, Hanlon Gasoline Company of Texas, Hanlon Pipe Line Company, and substantially all of this capital stock of Smith Brothers Refining Company, a natural gasoline manufacturing and oil producing company.

The Hanlon companies owned and operated four natural gasoline manufacturing plants in Texas having a combined capacity of 73 million gallons of natural gasoline and liquefied petroleum gases annually; tidewater terminals at Corpus Christi, Houston and Texas City, Texas, with sufficient pressure storage to handle full tanker loads of natural gasoline for export and coastwise movement; marketing contracts involving an annual volume of 250,000,000 gallons; a fleet of 150 natural gasoline tank cars; crude oil producing properties in North Texas, the Texas Panhandle and Oklahoma, with a net production of 3,500 barrels daily, and undeveloped potential oil and gas producing lands in excess of 225,000 acres.

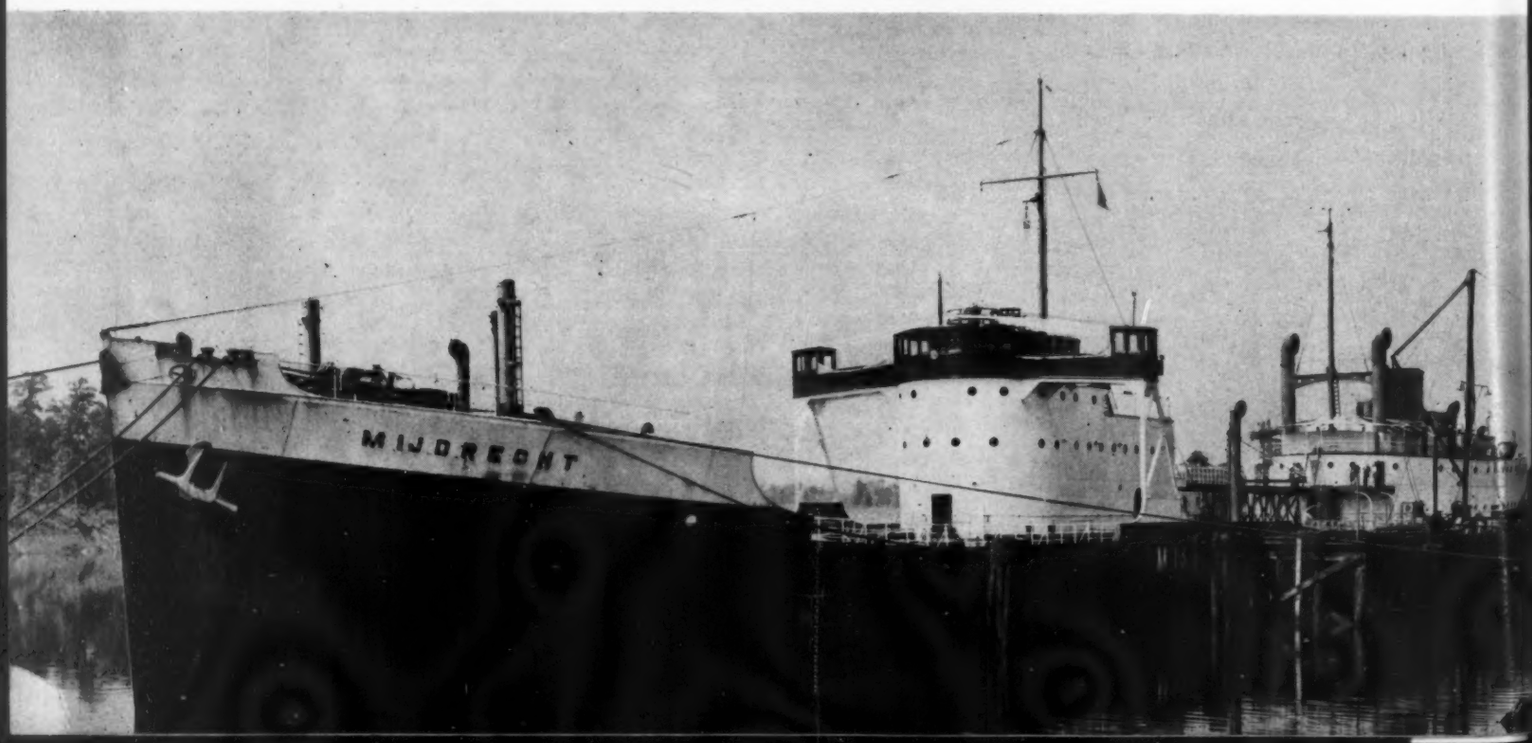
Warren owned and operated nine natural gasoline plants and held half interest in two other plants, all having a combined capacity of over 205 million gallons annually. It owned tidewater storage terminals at Corpus Christi, Houston and Port Arthur, Texas; Lake Charles, La., and Marcus Hook, Pa., marketing operations involving 500 million gallons of products annually; over 100,000 acres of undeveloped oil and gas leaseholds, and crude oil production of approximately 700 barrels daily.

W. K. Warren, President and Founder

Consolidation of the properties, therefore, gives Warren a potential sales volume in excess 750 million gallons annually, of which 278 million gallons are its own production; a large tidewater storage capacity at strategic locations; crude oil production in excess of 4,200 barrels daily, and approximately 325,000 acres of undeveloped leaseholds.

Prior to its listing on the New York Stock Exchange about a year ago, Warren Petroleum Corporation was owned, and has been developed by four men. They are President W. K. Warren, Executive Vice President J. A. LaFortune

Tanker Loading at Warren's Houston Terminal.



Vice President H. E. Felt and the late Charles E. Brown.

Warren was born in Nashville, Tenn., in 1897, and moved to the Mid-Continent oil fields in 1916. He worked for various oil companies, and was employed by the former Gilliland Oil Company when it was taken over by the former McMann Oil & Gas Co. Warren worked for McMann for a time before he developed his sales idea. He resigned and started his company on March 15, 1922. That was only a year after a group of natural gasoline manufacturers had met in Tulsa to deplore conditions within their industry, the attitude of the public toward their product, and to attempt to work out a solution of the industry's ills. The Natural Gasoline Association of America was the outgrowth of that meeting.

The oil booming city of Tulsa was full of petroleum marketers and brokers, but few of them specialized in any one product, and none devoted his time exclusively to natural gasoline marketing. Warren's plan was to devote his time entirely to marketing the production of small operators who could not afford a sales and accounting staff of their own, and to cater to large quantity buyers who naturally would prefer to deal with one source rather than attempt to comb the field continually in an effort to pick up sufficient quantities to fill their requirements.

Warren opened his office, consisting of two rooms in the Atco Building. His office help consisted of Mrs. Warren and one other assistant. Two months after he had started Warren Petroleum Company, Charles E. Brown resigned as production manager for the old Twin States Oil Company and joined Warren as an equal partner. That first year the two sold five million gallons of natural gasoline. Two years later the business had tripled and the two partners found they needed additional help. It was then that Joseph A. LaFortune first joined the company.

LaFortune had come to Tulsa from his home in South Bend, Ind., worked for a time at various jobs, including clerking in a small department store and soliciting advertising for an oil trade magazine, and finally had become assistant secretary of the Mid-Continent Oil & Gas Association. LaFortune wanted to increase his income, decided to produce a house magazine for some company, and hit upon the young and aggressive Warren concern as being the one in need of such a publication. He sold his idea to the two partners, and began editing "The Natural Gasser." Two or three months later Warren offered him a place with the firm. He became secretary, with Brown vice president and Warren president of the company.

Shortly after LaFortune joined the company he was successful in negotiating a contract with a Shreveport gasoline manufacturer which made Warren the sales representative of the manufacturer and gave Warren a firm supply of 45 cars monthly. This took the young company out of the class of broker and helped establish its reputation as a responsible operator with which refiners could deal on a secure basis not always provided by all Tulsa brokers. Since LaFortune's first contract the "sales representative" idea has been developed consistently. At the time of the Hanlon-Buchanan purchase Warren had 40 such contracts and the Hanlon interests 16.

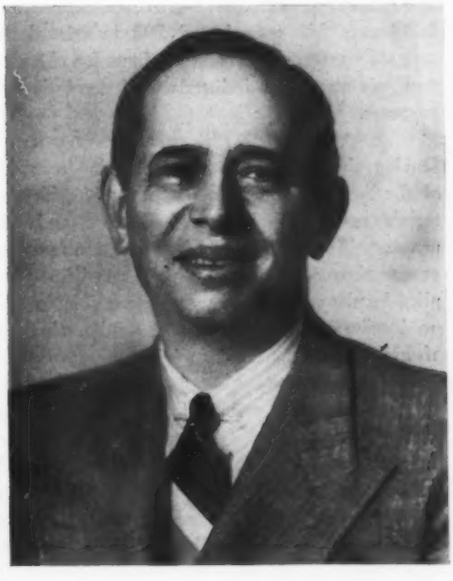
The organization continued to grow and prosper under the guidance of the trio. Then Brown died suddenly early in 1929, and Warren and LaFortune looked around for a successor. H. E. Felt, who had worked for the Atlantic Refining Company, and then was assistant to Dale Moore

J. A. LaFortune, Executive Vice President.

H. E. Felt, Vice President in Charge of L.P.G. Department.

Ray E. Miller, Newly Elected Vice President in Charge of Houston Offices.

J. H. Boyle, Newly Elected Vice President in Charge of Oil Production.



J. A. Padon, Newly Elected Vice President in Charge of Financial Affairs.

Natural Gasoline Storage at Port Arthur, Texas, Terminal.

in his large petroleum marketing company, was offered a partnership. He became secretary and took charge of sales, LaFortune moving to vice president. The next year sales reached 96 million gallons, an increase of 1800 percent in eight years.

The corporation remained primarily a natural gasoline marketer until 1935 when it purchased the natural gasoline plants and took over that department of the Amerada Petroleum Corporation and became a manufacturer. Among the employes moving from Amerada to Warren was

Warren Petroleum Corp. Natural Gasoline Plants

Location	Capacity Gal/Day
Grossville, Ill.[1] Griffin, Ind.	100,000
Salem, Ill.	100,000
Graham, Okla.	15,000
Maud, Okla.	30,000
Fittstown, Okla.[3]	25,000
Madill, Okla.	60,000
Stroud, Okla.[3]	15,000
Monument, N. Mex.	55,000
Fairbanks, Tex.	25,000
Holliday, Tex.[2]	53,000
Gladewater, Tex.[3]	175,000
Breckenridge, Tex.[3]	30,000
McLean, Tex.[3]	40,000
Sinton, Tex.[3]	20,000

[1] Jointly owned with J. E. Crosbie, Inc.
[2] Under construction
[3] Formerly owned by Hanlon-Buchanan

H. W. Harts, then assistant plant superintendent, who now is vice president in charge of manufacturing. The same year the management decided additional sales help was needed, and obtained Sam I. Hulse from Sinclair Oil & Gas Company, where he had been associated for a number of years with A. T. Scherer. Hulse now is vice president in charge of natural gasoline sales.

Warren and his associates foresaw and capitalized upon the rapid development of liquefied petroleum gases. As a result they were in an excellent position to be one of the major independent suppliers of various special light hydrocarbons required in the manufacture of war materials. In 1945 Warren manufactured 49 million gallons of natural gasoline and marketed a much larger quantity for others.

Warren first entered the liquefied petroleum gas field as a manufacturer and wholesale distributor in 1935. Sales that year, all from one plant, totaled less than 100,000 gallons. By 1940 sales were above 32,000,000 gallons.

Realizing that the LPG industry was another prodigy, the corporation set up a new division with Vice President Felt in charge. In 1941 Mr. Felt obtained the services of G. L. Brennan as manager of the LPG Department. "Jerry" Brennan came to Warren from Phillips Petroleum Company where he had been closely associated with pioneer development of the new industry and with his assistance the new department's sales have continued to expand phenomenally. In 1945 sales of the division approximated 200,000,000 gallons, an increase of over 500 percent in five years, and with the Hanlon purchase the potential will exceed 275,000,000 gallons annually. This is roughly 20 percent of the industry's total sales of LPG.

In the past five years Warren has been building a fleet of high pressure LPG tank cars. Present fleet consists of 1,567 cars which is made up of 300 natural gasoline cars owned and 425 leased; LPG cars 550 owned and 292 leased. LPG cars are engaged in moving products for chemical synthesis as well as industrial and domestic fuel purposes.

During the war years the corporation was one of the largest independent suppliers of such materials as normal butane, iso-butane and isopentane. The Petroleum Administration for War at one time estimated that the ingredients supplied by the corporation were responsible for the production of approximately 50,000 barrels daily of high octane aviation fuel.

In line with the corporation's successful plan of providing storage for natural gasoline during the periods of light demand, the LPG division has acquired by purchase and lease a large quantity of storage. The corporation now owns in excess of 3,000,000 gallons of storage, exclusive of that located at plants, and has under lease an additional 5,500,000 gallons of storage at Port Arthur, Houston and New Orleans. It also is reported that the corporation is erecting approximately 2,000,000 gallons of LPG storage at tidewater terminals at Houston and Texas City.

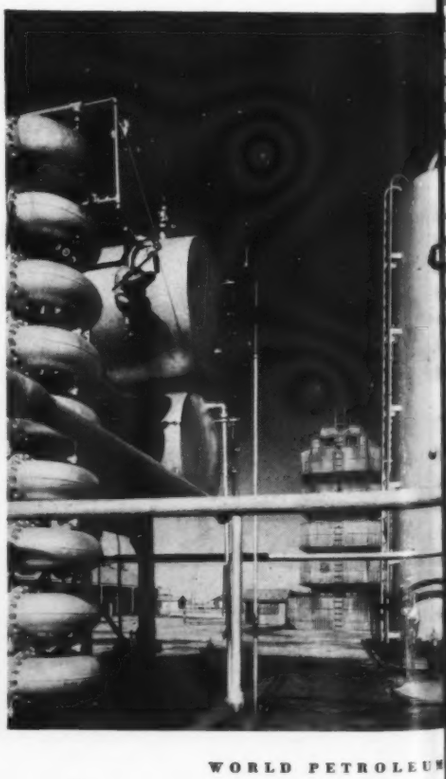
Thus far there has not been a substantial movement of LPG in the export and coastwise trade but it is known that Warren is looking closely into the possibilities of fitting ocean-going carriers with pressure storage tanks so that excessive freight rates to the rich eastern market can be reduced and foreign markets developed.

The corporation first entered the oil and gas producing division of the industry in 1944. The Hanlon companies had entered that field several years before. That branch of the business has been developed rapidly in the relatively short period since it was started.

The Hanlon companies also were developed by a small group of men. Hanlon operated in West Virginia and Ohio from 1908 until 1916 when he came to Tulsa to become an official in the old Chestnut & Smith Corporation, when it was beginning to move to the forefront among natural gasoline manufacturers in the Mid-Continent. J. H. Boyle came to Tulsa to join the Phoenix Refining Company of Sand Springs, Okla., and was vice president and general manager when that company was purchased by Chestnut & Smith. He joined the latter organization

(Continued on page 56)

Warren Gasoline Plant, Monument, New Mexico.



INDUSTRIAL RESEARCH AND NATIONAL SECURITY*

By ROBERT P. RUSSELL

President, Standard Oil Development Company

WE learned from the war that our strength as a nation is measured by the effectiveness with which our science and industry can be mobilized for national defense. Our victory was in large measure the result of a successful race against time in creating new weapons and getting them into active military use. In this race, fortunately, we were out in front. But today we know that our margin of advantage was often dangerously close. It was measured more frequently in weeks than in months, and sometimes only in days.

In order to help build a world of peace, we must guard against deterioration of the high standards of technical achievement set during the war. To be secure as a nation, we must be able, quickly, to place in the hands of our military forces all they require in the way of superior equipment. This achievement can come only from an integrated national effort in which the essential ingredients are (1) an adequate stockpile of basic scientific knowledge, which must come mainly from the universities; (2) applied science and development, contributed principally by the research agencies of industry; (3) sound engineering, again stemming from the industrial research and development groups; (4) adequate industrial capacity; (5) able production management; and (6) such liaison between all these groups on the one hand and the military services and government on the other that our total effort can be marshalled promptly and wherever needed. This kind of planning in peacetime will help prevent another world war.

Above all, we must maintain an atmosphere in which problems of national defense can be as readily solved in peacetime as they were under the stress of war. Time is so vital in today's world that we dare not leave any problem involving our national existence to be solved under the pressure of an international emergency.

The contributions to our technical preparedness come from many quarters. It would be impossible to consider all of them, so I wish to confine myself to the contribution of our coordinated industrial research and development laboratories. I am convinced that our position of leadership in the world could not be maintained without their help. As a member of such a research and development group, I want to explain how we operate, point out some of our problems, and consider certain tendencies which could seriously hamper peacetime work on problems vital to America's welfare.

Robert P. Russell, left, is presented with the American Institute of Chemists 1946 gold medal for "noteworthy and outstanding service to the science of chemistry" by Dr. Gustav Egloff, President of the Institute.

A generation of experience has resulted in the "teamwork" principle being followed almost universally by research and development organizations. The complex problems of modern industry are best solved by seasoned teams of professional men—chemists, physicists, mathematicians, and engineers—with their corps of assistants, operators, mechanics, helpers, and clerks. Each major problem involving applied science requires not only the full-time effort of such a team but also the advice of numerous other staff members. The old saying that too many cooks spoil the broth does not apply to the modern laboratory. Here the more minds that can be brought to bear upon a problem and the more ideas that can be generated, the greater the progress.

I know of no major new development that was solely, or even principally, the product of one man's genius. In every case of which I have personal knowledge, scores of workers contributed importantly to the final result. Admittedly the basic idea for an operation may have stemmed from the "flash of genius" of a single person, but the skeleton would still be dangling in the laboratory closet unless it had been equipped with blood and sinews, a nervous system and arteries. These came from many subsidiary, separate developments, each of which was necessary to make the whole body live and breathe.

The final development of a research project may, therefore, include the contributions not only of the team specifically involved, but also of second and third teams, and of supervisory persons who may have spent but little time on it. It is not infrequent that suggestions vital to the success of a project come from men not concerned at all with the problem in question, and whose only contact with it was through discussions at laboratory staff meetings.

Thus it will be seen that important developments cannot be lifted like commodities from a shelf. Each is the result of exhaustive research, long experimentation, many failures, and the application of the entire facilities of a large organization.

*An address before the American Institute of Chemists on presentation to the author of the Institute's gold medal award, May 17, 1946.

The inventions and ideas which contribute to the success of a project are drawn from multiple sources, many of them coming from persons working in altogether unrelated fields.

During the war the vast complex of American research and development organizations was mobilized for national defense. It is now a matter of history that the remarkable achievements of American science and the tremendous production of American industry were vital factors of victory in World War II. That war was fought in the laboratory and the factory as well as on the battlefield, on the sea and in the air. American research and our system of production proved their strength. Not only did we turn out weapons and supplies in vast quantity, but our research and development teams displayed remarkable ingenuity in inventing new and improved arms.

Devices such as the flame thrower, radar, proximity fuse and atomic bomb were the results of cooperation between industry and government agencies. These and similar projects were undertaken by industrial organizations as a patriotic duty and as a contribution to our strength as a nation.

Today there is a tendency to forget the motives which underlie wartime cooperation. The supposition has become widespread that industrial laboratories are to some degree dependent on government financed work, or at least that federal contracts are a boon to them. This is an impression I would like to correct.

The peacetime programs of all important industrial research and development groups already include far more work than can possibly be accomplished in even a period of years. This is partly the result of the absorption of the laboratory staffs in war jobs during the last five years, and partly the consequence of the growing technical complexity in practically every line of industrial activity. The situation in my own company is, I believe, typical of that which confront similar groups. Problems of commercial importance to our company's operations, which must be solved if our business is to grow and prosper, will occupy the full capacity of our organization for many years.

Further, as a result of the war and the drafting of personnel from our laboratories and training centers, capable technicians are pitifully scarce. This is no temporary matter, as most of you know. An adequate supply of well trained technical men will not be available for many years. But even if technical men were available in sufficient numbers, we still could not provide them with adequate facilities because of the national construction emergency. It is impossible to predict how long it will take to provide sufficient facilities even for existing personnel, let alone make a reasonable guess as to when necessary expansion can be undertaken.

Then there is the matter of establishing a fair price for projects undertaken for government. A government agency contracting for a highly specialized device cannot pay, and is not expected to pay, for more than a small share of the backlog of tediously gained knowledge, the years of background research, the failures, the technical skill, and the costly equipment that qualify a laboratory to undertake such a development. These costs must be carried largely by other projects, and this can become an important factor in the planning of research and development programs.

Major research and development organizations, therefore, are not looking for additional work. They do not need revenue from government-financed projects. It goes without saying that, from a sense of national duty, the important research and development organizations will continue to make every effort to handle projects important to the nation's defense. But the services which these organizations can perform and which are so important, can be obtained in full measure only if, in the laws governing these services, consideration is given to certain basic problems faced today by our industrial scientific groups.

One of these basic problems concerns allocation of government contracts. The directors of a research and development organization would like to be certain that any government-financed work they are asked to undertake in the interest of national security could not be handled more effectively by some other group. My own company for example—and I am sure it is typical—will gladly accept work that it feels itself preeminently qualified to do. But it would be reluctant to undertake development which could be handled more efficiently by some other organization. Clearly, the public interest is best served by having the work done by the group most qualified to handle it.

Secondly, the industrial organizations engaging in government work should have all pertinent information concerning the problems they are asked to solve. Unless information is complete and is unreservedly available, unless the problem is revealed in its full scope, development work cannot be carried on with efficiency. A policy of compartmentalization results in decreased effectiveness of scientific and research effort. Those in charge of national defense projects should accept the fact that properly qualified members of our industrial laboratories are patriotic citizens entirely capable of safeguarding military information. This has been amply demonstrated by our war experience.

Finally, research and development organizations want to be sure that in undertaking to do government-financed work, they will be able to apply freely and without reserve the entire resources and ability of their organization. It is in this connection that the patent provisions contained in government contracts and certain pending legislation for the control of patent rights are of vital public concern.

The result of an important development project, involving multiple ideas and inventions, is a process covered by patents. We have long been accustomed to look upon the patent right as the inventor's reward for disclosing his invention, and the vigor that has characterized our industrial development as a nation springs largely from our patent system. With minor exceptions it has served the country well.

During the war, the Office of Scientific Research and Development, the National Defense Research Committee, the Army, the Navy, and the Air Force usually provided in their contracts with industrial organizations that the government would receive a royalty-free license to use for purposes of national defense any inventions made in the course of work carried out at government expense. These contract provisions, as worked out and applied during the war, are in my opinion a good method for handling the relationships of government with private research groups. They completely safeguard the interests and rights of the government. They are, at the same time, fair to the research organization.

It should be realized that under present law the government has the right to use any invention covered by patents and to make or have made for its use anything covered by patents. The owner of the patents in such cases has the right to reasonable royalties which, if necessary, can be determined by the courts. But no patent can block the government from obtaining what it needs for its own use.

Since the war, however, the idea has grown that we should go far beyond these provisions, specifically that any inventions made in the course of work financed by the government should become government property and be licensed freely to anyone. The root of this idea is the sound premise that no one should derive private profit from projects financed with public money.

No one questions that this premise is entirely reasonable. In actual operation, however, I am afraid the provisions intended to insure it would react against the public interest and would fatally handicap development work for the Armed Forces.

It is impossible to divide a man's mind. An industrial research organization cannot devote itself to a problem for government without bringing to bear on that problem all of its accumulation of background knowledge and facilities. This is particularly true if the problem is in the field of the organization's normal industrial activity. No one can say how much of the result of a given scientific study derive from the part financed by government and how much from the private organization's own prior and current

work in the field. If an industrial research group must hand over all discoveries made in the course of a government project, and if, in addition, its past and present discoveries are to be dumped into the government pool, it becomes difficult if not impossible for the organization to engage in such work without endangering its competitive existence.

Further, the full potentialities of any discovery are usually realized only after years of work. This work entails many risks and, generally a number of failures, perhaps costly failures. If no individual or group can hope to gain from a discovery derived possibly in part from work in the public domain, who can be expected to carry development forward aggressively and efficiently? There is a saying that what is everybody's property is nobody's property, and nowhere does this apply with greater force than in the field of applied science.

As an example of legislation in the scientific field currently under discussion, let us consider the National Science Foundation Act of 1946, known as the Kilgore-Magnuson Bill. In its present form the bill provides that an industrial organization entering into a contract with a government agency shall make available to that agency full data on all inventions, discoveries, patents, patent rights and findings produced in the course of the development. These discoveries and inventions can then be retained by the government agency or released to the public on a non-exclusive, royalty-free basis. Or the government agency may provide for the retention by the contractor of such patent rights as the government agency deems fair and equitable, and consistent with the national interest.

Under these conditions, I believe that many research and development groups would be practically prohibited from undertaking work for the government in fields of their own commercial interest which incidentally are the fields of their outstanding competence. For one thing, it would be difficult, if not impossible, to separate patent rights paid for by the government from those stemming from the normal commercial activities of the company. I seriously fear that the ultimate effect of such legislation would be to stifle development for the Armed Forces rather than protect it.

Another provision of the bill, to follow this example further, stipulates that before entering into any undertaking or agreement, the head of a government agency shall make every reasonable effort to arrange for the conduct of the necessary research and development without entering into a contract which provides for the return to the contractor even of such patent rights as the government agency deems fair and equitable, and consistent with the national interest. This clause places the government agency in the position of having to allot contracts to whichever industrial organization is willing to grant the most extensive patent rights to the government, although quite possibly this may not be the organization which can do the best job. Under this provision a tendency to place the question of patent rights ahead of the competence of the contractor could easily develop.

These considerations are not a matter of concern to industry alone but have also received the attention of persons in positions of high responsibility in the government. In a letter to Senator Thomas dated April 5, 1946, Secretary Patterson emphasized that such provisions "would impose an impossible burden on the Secretary of War." Quoting further from the Secretary's letter, "Experience has shown that a contract requiring the vesting of full ownership of patent rights in the government would further narrow the government's choice of contractors. . . . It is extremely important that the War Department should be free to contract with any qualified contractor in order to provide most effectively for the national security. Any restrictions on the availability to the War Department of contractors will seriously impair national security." Secretary Patterson recommended that the subsections of the bill relating to patent rights "shall not apply to the War or Navy Departments or any established defense agency, provided that the War or Navy Departments or established defense agency shall obtain in any federally-financed research and development contract at least an irrevocable, non-exclusive, royalty-free license for governmental purposes of the United States to the extent that the contractor is able to grant same." In a similar letter to Senator Thomas, Acting Secretary of the Navy W. J. Kenney also expressed opposition to the patent provisions as set forth in the bill.

Both departments recommended, in effect, peacetime continuation of the patent provisions which were employed during the war and under which most of the industrial organizations found themselves able to operate.

Concerning this matter of patent provisions, Dr. Vannevar Bush, chief of the Office of Scientific Research and Development, emphasized in a report to the President that, although public interest must be protected, at the same time a contracting organization must be left with adequate freedom and incentive to solve problems assigned to it. He suggested that the public interest would normally be satisfactorily protected if the government received a royalty-free license to use for government purposes any patents resulting from government-financed work. He specifically urged that there should not be any absolute requirement that all rights in such discoveries be assigned to the government, and he recommended that legislation should leave the administering agency with such discretion in its patent policy that arrangements could be adjusted to meet both government and company interests.

The American Chemical Society has stated that it does not believe there is any necessity to include in pending legislation any special patent clauses over and above those which now pertain to all government-financed research carried on today under existing statutes.

I am convinced that the principal United States industrial research and development organizations are badly needed now and will continue to be needed in the solution of problems essential to national defense. Therefore, it seems to me of vital importance to establish conditions under which these companies can cooperate most effectively. This is a matter that directly affects every one of us here tonight and every American citizen. A step in the wrong direction at this time could seriously impede the industrial development upon which the military strength of our nation depends.

Another bill directly affecting technical progress and of great current interest is the McMahon bill for the development and control of atomic energy. This bill authorizes the Atomic Energy Commission to requisition or condemn any invention which utilizes fissionable material or atomic energy, or any patent or patent application covering any such invention or discovery. Further, it requires the Commission to declare any patent to be affected with the public interest, and therefore subject to compulsory licensing, if the invention or discovery covered by the patent utilizes fissionable material or atomic energy, and the licensing of such invention or discovery is necessary to effectuate the policies and purposes of the Act. These policies and purposes are so broad that they bring within this provision practically any patent in the whole field of fissionable material and atomic energy, regardless of whether a military application is involved.

Development in this field is of such vital significance to our national defense that there must be government control of source materials, and the production of fissionable material should be under strict government license. At the level of adaptation, however, it seems to me that our patent system could be relied upon to safeguard the national interest and to advance the art just as it has promoted progress in so many other fields in the past.

It is my conviction that practically all United States industry is most anxious to see sound, widespread development and industrial use of atomic energy. Given incentives such as are provided in the United States patent system, I feel sure that vigorous competition in the atomic energy field would result in the creation of important inventions covering major peacetime industrial applications. Yet I have heard directors of the research and development departments of large United States industrial organizations express the opinion that proposed legislation on atomic energy would reduce industrial incentive so sharply that their organizations would be unable to follow an aggressive experimental pol-

(Continued on page 58)

CAPITAL SIDELIGHTS ON OIL

By W. J. MADDOX, *Chief of World Petroleum Washington Bureau*

Advisory Board Censored

Julius A. Krug

Secretary of Interior "Cap" Krug's plans for setting up an industry advisory committee to continue the wartime liaison with government maintained by PIWC has run into difficulties. The Department of Justice has borne down heavily with its blue pencil on the names of many of the oil men slated to be members of the industry group. Its action brings echoes of the so-called Mother Hubbard suit instituted by the Department against nearly two score of companies and pending now in the District Court.

It is understood that Krug, previous to making his announcement last month that such an advisory committee was being formed, had cleared the general idea with Attorney General Tom Clark. Both he and Ralph Davies, who has been helping set up the organization, were optimistic at the time that they would be able to announce the set-up of the committee shortly. It now develops that the hitch is over personnel rather than the plan itself. Elimination of every man or company who was involved in these two pieces of litigation would narrow the field down considerably and it is doubtful if a group representing the whole industry could be obtained if men connected with companies against which government proceedings have been instituted were to be excluded.

Novel Plan for Naval Reserve

In 1942, as a result of a study covering South American and North American oil fields, L. W. MacNaughton of the firm of DeGolyer and MacNaughton, special advisors to the Secretary of the Navy on petroleum matters, came to the conclusion that in 1950, regardless of the length of the war, the United States would become a net importer. Today he says nothing has happened to change his opinion. Although discovery of some large fields may change the situation slightly, he says he is still using 1950 as the turning point for the United States as an oil nation.

As consultant to the Navy on the development of its No. 5 petroleum reserve at Point Barrow, Alaska, MacNaughton has suggested a means of meeting the diminishing commercial production in California. Here's his idea:

"The value of a petroleum reserve to the Navy, of course, is greater if it is located within the continental United States. It can be defended much better than if it is located outside the continental United States. So I made the suggestion that this reserve, if oil were found, could be developed and oil transported to the west coast and there turned over to companies to do with as they see fit. But for each million barrels we deliver to them they give us the right to a million barrels in the ground within continental United States. We then not only have the oil that we have produced up there, but we have the oil within the continental United States."

Navy's figures indicate that oil from Alaska to San Francisco, to the Richmond refinery, compared with oil from Taft, California, to the Richmond refinery, on the basis of dollar oil, would cost about 38 cents more per barrel at present prices.

Continental Shelf Survey

A belated request by the Interior Department for some $5,000,000 for surveying the Continental Shelf and for development of instruments and methods for prospecting for under-ocean reserves has run into trouble with the Budget Bureau. The Bureau refused to include the item in the supplementary appropriation bill for the fiscal year 1947. However, there is good assurance that a place for the item will be made in the department's regular request for funds for 1948. In the meantime, work on the Shelf will be pushed as far as possible with other funds that are available for geophysical work. The department feels that survey of areas comprising the Continental Shelf should proceed conservatively but that, inasmuch as it is such a big undertaking, no time should be lost in getting the project underway.

Flying Mag Proves Worth

W. E. Wrather

According to Dr. W. E. Wrather, director of the U. S. Geological Survey, the airborne magnetometer which was used so effectively in spotting enemy submarines during the war has a useful peacetime future in making rapid and accurate geophysical surveys of metal and petroleum producing areas. He reveals that extensive tests have shown the device to be unsurpassed in reliability while far exceeding the speed of any other method of conducting magnetic reconnaissance surveys. It has the further advantage of being equally adapted for use over land or water.

During the past two years the Survey has employed the instrument, chiefly in cooperation with the Office of Naval Petroleum Reserves, in making test surveys of more than 40,000 square miles of territory, from the northern coast of Alaska to the Gulf of Mexico, at heights of from 150 to 14,000 feet above the ground. Most obvious advantages of the equipment are its speed of operation in the field and the fact that it can be used to map areas where distance or difficult terrain conditions make ground surveys of the same type difficult or even impossible.

Fuel on V-J Day

How badly the Navy was up against it for oil on V-J Day was recently revealed by Lieut. Comdr. R. J. Bradley, USNR, economist of the office of Naval Petroleum Reserves, testifying before the House Appriations Committee. Bradley told the congressmen:

"When the war with Japan ended, in August 1945, supply of oil available to the United Nations, was not sufficient to permit us to continue the war at the pace at which we were prosecuting it for more than three or four weeks more. Bunkers in the far Pacific were down to a 15-day supply. And I understand that Mr. Davies, the Deputy Petroleum Administrator for War, had on his desk, ready for signature, a proposed plan to bring forth the necessary amounts of oil to finish the war at a scheduled rate which called for, among other things, reducing again the amount of gasoline available to car owners, strike control allocation of foreign shipments, and bringing in production some oil which it was completely uneconomic to get out, bringing in production from other foreign sources, and cutting off some supplies to our allies.

"That is not generally known, because when a war is over, everybody thinks it is great, the 'hoop-la' is over; but if the war had lasted another month more definitely if it had lasted three months, the public would have had a severe shock."

Petroleum Attaches Face Cut

The two deepest slashes taken by the House in the State Department's requested appropriation for the fiscal year 1947 fell where they are likely to affect the department's petroleum activities seriously. In paring the total funds requested from $127,885,000 to $104,783,000, the House lopped off almost $9,000,000 from the amount Secretary Byrnes thought necessary to carry on the Foreign Service and $6,000,000 from the funds required for running his office. The former cut, if sustained by the Senate, would lay a heavy hand on the department's petroleum attaches, and the latter might cause some curtailment in the petroleum activities carried on by his office here in Washington.

Public Lands Leasing

Senator Carl Hatch

Senators Hatch and O'Mahoney, the former chairman of the Public Lands Committee, have a bill now reported to the Senate that proposes the first general revision of the Mineral Leasing Act since 1935. According to the committee's report to the Senate, the bill is designed "to stimulate the discovery of new petroleum reserves; to promote the development of oil and gas on some 300,000 square miles of potential oil lands of the public domain; to grant incentives which will contribute to American leadership in industry and world affairs."

The bill would amend Section 17 of the Mineral Leasing Act to provide that lands within a known geological structure of a producing oil and gas field shall be leased at competitive bidding at not less than 12½ percent royalty; units so leased not to exceed 640 acres. Lands not within such proven structure, or wildcat acreage, to be leased to the first applicant at a royalty rate of 12½ percent. All leases are for a primary term of five years and continue thereafter for so long as oil or gas is produced in paying quantities. Leases, with certain exceptions, are subject to one renewal for five years; if not subject to renewal are extended two years if diligent operations are in progress at lease expiration date.

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Oil Company Staff Changes

Austin Cadle

Earl W. Wagy

AUSTIN CADLE has been appointed manager of Standard of California's Economics and Statistical Department to succeed Earl W. Wagy who is retiring.

Cadle joined Standard in 1922 immediately following his graduation from Stanford University as a geologist. He has worked in the economics division and general auditor's department as head of the economic cost analysis division.

Wagy's retirement marks the close of a long career in the petroleum industry—a career chosen in 1905 when he witnessed the drilling of the first oil wells in California's Bakersfield area. He was with Standard for 26 years, 21 of them as manager of the economics and statistical department.

FRED B. KOONTZ, vice president in charge of refining for Mid-Continent Petroleum Corp., Tulsa, has been elected president to succeed Jacob France who has been made chairman. Mr. France has been connected with Mid-Continent since it was first organized as Cosden & Co. in 1913. He was vice president and general counsel until Joshua Cosden retired in 1924 when he became president of Mid-Continent, the successor company. He has divided his time between Tulsa and Baltimore where he is chairman of the Equitable Trust Company.

Mr. Koontz has been engaged in refining since 1907 when he went to Tampico as chemist for Standard of New Jersey. He came to Tulsa in 1917 as process superintendent for Cosden. In 1922 he was made superintendent and was elected a vice president and director in 1928.

EARL W. RUSSELL has been promoted to administrative assistant in the office of President A. W. Peake of Standard Oil Company (Indiana). Mr. Russell joined the company in 1928 as a clerk. In 1942 he was made office manager in the sales research department. Mr. Russell was a navy officer for two years during World War II.

JOSEPH L. SEGER has been appointed general counsel for the Interstate Oil Pipe Line Company. He has been attorney for The Carter Oil Company for the last 13 years and since September, 1944, has served as secretary. He has resigned these positions.

E. W. LOUNSBURY has reopened his offices as oil and tanker broker at two Broadway, New York. In 1942 he resigned as secretary and director of David C. Reid Co., Inc., to serve as a major in the Army Transportation Corps. After his tour of duty in the Arctic and Europe he served the War Shipping Administration at Washington as a supervisor of part of the WSA tanker fleet.

E. J. BURKHARDT, aviation sales manager of Standard Oil Company of Ohio, has been elected chairman of the newly-formed aviation advisory committee of the American Petroleum Industries Committee of the American Petroleum Institute. Aubrey Keif, aviation sales manager of The Texas Company, was named vice-chairman, and A. T. Hapke, American Petroleum Industries Committee, was elected secretary.

JOSEPH G. ALTHER, formerly vice president and director of Universal Oil Products Company, has severed all connections with that company after thirty years of service. In May, 1945, he resigned but agreed to act as consultant to them for a period of one year which terminated May 31, 1946. Mr. Alther now has established a general consulting office in Chicago.

Joseph G. Alther

HAROLD W. HOOTS has resigned as chief geologist of Richfield Oil Corporation to establish an independent consulting practice. Rollin Eckis, previously assistant chief geologist, succeeds him. Mr. Hoots has been head of the geological department of Richfield since the formation of the new corporation in 1937. Mr. Eckis also has been associated with Richfield since 1937. During the last few years he has shared the responsibilities of exploration activities throughout California, and in Oregon, Washington, New Mexico and West Texas.

ALAN I. McCONE has been appointed manager of industrial relations for Catalytic Engineering and Construction Company. Mr. McCone formerly was assistant coordinator of labor relations at Sun Oil Company's Marcus Hook (Pa.) refinery.

N. R. GRIMSHAW, manager of the South Bend, Inc., sales field, for Standard Oil Co. (Indiana), retired on May 29 after more than 40 years service. C. C. Inglefield, assistant manager, succeeds him and M. E. Crow, sales manager at Indianapolis, Inc., was advanced to succeed Mr. Inglefield.

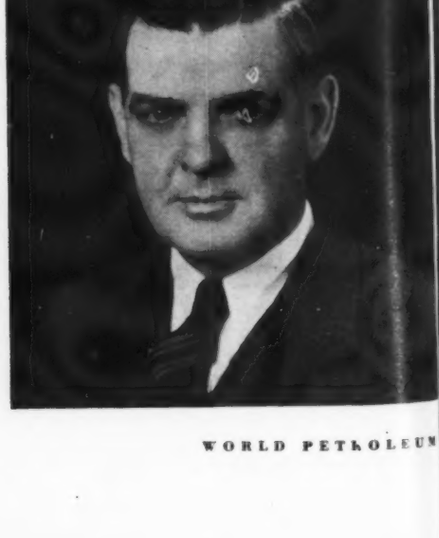
KENNETH D. DEMAREST, formerly with the Griscom-Russell Company, has been appointed district engineer of the Fluor Corporation, Ltd., in its New York headquarters. Demarest's work for the past 15 years has been in connection with the oil, gas, and chemical industries. His duties have taken him over most of the United States and as far as Venezuela.

GERRIT A. VISSER, formerly executive in charge of the manufacturing engineering division of Manning, Maxwell and Moore, has been named vice-president and works manager of Franks Manufacturing Corp., of Tulsa, according to Carl White, Jr., President. Visser was born and educated in the Netherlands, graduating from the University of Delft in Europe with an M.E. Degree. He came to America twenty-one years ago.

HAROLD G. OSBORN has been elected vice president in charge of manufacturing of Continental Oil Company. He succeeds Dr. Walter Miller, veteran Continental vice president, who retired March 1st.

Osborn has been part of the executive staff of Continental's manufacturing department since November 1921, when he was employed in the power division of the company's Ponca City refinery. The following year he was made office assistant to Dr. Miller, became assistant manager of the manufacturing department in 1927, and manager in 1935.

Harold G. Osborn



International News and Notes

Peter Overgaard

PETER OVERGAARD has been appointed manager of the newly formed Catatumbo Transportation Company which transships materials from Maracaibo to the Barco concessions in Colombia, operated by Colombia Petroleum Co., Colombian affiliate of Texas-Socony.

Born and educated in Denmark, Mr. Overgaard went into the oilfields after World War I, following several years at sea. His first oil job was in the transportation division of Tropical Oil Co. at Baranca Bermeja from 1922 to 1927 from which he went to Creole's transportation department from 1928 to 1931. After service with Mene Grande he went to Colombian Petroleum Co. in 1936, resigning as Transportation Superintendent to go to Maracaibo.

All of the Barco supplies are handled by Catatumbo Transportation Co. who receive the materials in Maracaibo, transship them by barge across Lake Maracaibo and up the Catatumbo River, then move them on river barges up the Tarra; the distance covered in the trip being nearly 500 kilometers.

Reopens Dutch Harbor Terminal

STANDARD OF CALIFORNIA has reopened its terminal at Dutch Harbor in the Aleutian Islands, which has been operated by the Navy since the outbreak of the war. The "H. D. Collier," restocked the terminal with 5,670,000 gallons of petroleum products. The company plans to build two new bulk plants in Bristol Bay, at Dillingham and Naknak on the shore of the Alaskan mainland, at a cost of $105,000. Upon completion this summer, they will be supplied from Dutch Harbor, which will also serve the Bering Sea, Norton Sound, Nome and the Arctic Ocean areas.

Tells Nomads of South America

CHILE'S first oil well, brought in last December in the Magellanes region in the southernmost region of that South American country is not in itself particularly important but an immense structure has been proved, according to Sam Low, Houston lawyer, who served for three years during the war in Santiago as a representative of the Board of Economic Warfare.

Speaking at the monthly meeting of the Houston chapter of Nomads, Low was critical of the United States' "pin-pricking" policy toward Argentina, saying "You can whip a man and make him respect you, give him your shirt and make him love you, but you can't pin-prick anyone into friendship." He thought the State Department's "Blue-Book," issued on the eve of the election in Argentina actually swung the balloting of Peron.

Reverting to Chilean developments Low Pointed out that an American geologist, Glen Ruby, made the locations in Chile and that a Texas drilling firm, George P. Livermore, Inc., which drilled the well has a contract with the government for additional drilling.

"In the opinion of a number of geologists the Bolivian Chaco contains the best reserves on the continent," Low declared, commenting that "best results likely would come under private operation."

The United States policy in paying liberally for materials supplied by South American countries during the war was justified, the speaker declared. He described the procedures to be followed in doing business with Chile and said that those who adopted these would find a good field for sales "although it must be remembered that we must continue to buy from them if they are to have the dollars demanded for United States products."

After his service in South America had ended, Mr. Low was awarded the Order of Merit by the Chilean government.

Lord Bearsted Retires

As a result of ill health, Lord Bearsted retired on July 12 as chairman of Shell Transport and Trading Co., Ltd. Sir Frederick Godber is his successor. The vacancy left by Sir Frederick Godber's consequent retirement as a managing director of the major operating companies of the Royal Dutch Shell Group of companies has been filled by the Honorable Frank Hopwood.

Mr. Hopwood was resident in New York from January 1942 to May 1945 as President both of Asiatic Petroleum Corporation and The Caribbean Petroleum Company. During that time he was actively associated, through PAW appointed industry committees, with the co-ordination of the petroleum resources of the allies and was the representative in the United States of the British Petroleum Board.

Creole Official Resigns

John L. Kalb has resigned as a vice president and director of Creole Petroleum Corporation to accept a new post with the International Petroleum Company, Ltd. Mr. Kalb has been with Jersey Standard and its affiliated companies for more than twenty years, having spent most of his time with Creole in Venezuela.

At the same time Creole announced the election of Harold W. Haight, production manager of the company in Venezuela, as vice president and director to fill the vacancy. Mr. Haight began his career in the oil industry in Mexico in 1927, as a Torsion balance helper with the Cia. Transcontinental de petroleo, S. A. In 1937 he was transferred to the Standard Oil Company of Egypt as field superintendent and later was made manager and chief geologist. In 1945 he joined Creole in Venezuela where he has been in charge of the production activities of the company.

Exploration in San Juan, Argentine

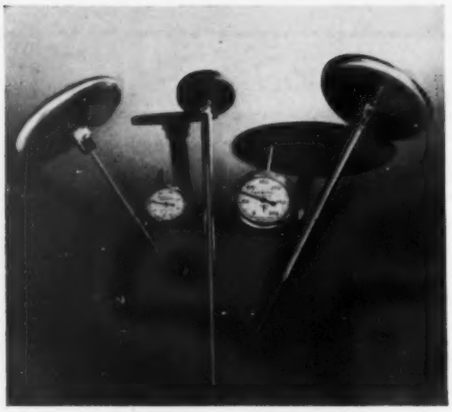
IN COLLABORATION with the provincial government of San Juan Province the Yacimientos Petroliferos Fiscales has completed preliminary geological studies and has started drilling a "wildcat" well at Niguivil Viejo, department of Jachal. If successful, this will open up new petroleum territory in the Argentine Republic.

Seeks American Equipment

MATIERES PREMIERES & FOURNITURES INDUSTRIELLES ("Ceres") 98 Calea Mosilor, Bucarest, Romania, has written WORLD PETROLEUM that it desires to resume handling American oil industry equipment including drilling equipment, electrical goods, pumps, tubular goods, wire rope, refinery chemicals, etc.

Luis Wolf has been appointed Secretary of the New York Technical and Commercial Office of Yacimientos Petroliferos Fiscales, oil enterprise of the Argentine Government. He has been in New York since June 2, taking charge of his new duties.

A group of international visitors entertained by the Los Angeles chapter of Nomads at its May meeting is shown in the photograph below. Left to right (standing) are W. C. Eyre, Arabian American Oil Company; Milton Hobbs, NKPM; S. Y. Chow, Chinese National Resources Commission; Erso Bonebakker, Shell; Lieut. A. A. Middleberg, Shell; (kneeling) J. W. Clampitt, Iraq Petroleum Company; Sanford Hall, Burmah Oil Co. Ltd.



New Dial Thermometer

NEW bimetallic dial thermometers in various ranges from 90 to 1000° F. recently have been announced by Equipoise Controls Inc. Measuring elements are provided with stainless steel cases, connection nuts and stems. Shaft and indicating pointer operate as a unit being the only moving part since there are no pivots, mechanical linkages or gears. Temperatures can exceed scale ranges 10 to 50 percent depending on the model without damage to thermometers. Laboratory dials with both C and F scales are available. Separable sockets are of the high pressure type for universal service conditions.

Synthetic Lubes and Fuels Shown

A demonstration of synthetic fuels and lubricants for use by landing craft, amphibious tanks and experimental gas turbine and turbo-jet engines was staged for the Army and Navy at Annapolis on June 14. The products used were supplied by The Texas Company and it was revealed by Dr. W. E. Kuhn, manager of the company's Technical and Research Division that Texas has developed methods for making synthetic gasoline, lubricating oils, greases and diesel fuels.

According to Dr. Kuhn synthetic of high octane rating, high octane diesel fuel and jet fuels can be obtained by burning methane in an atmosphere of pure oxygen, producing carbon monoxide and hydrogen, which are the building blocks for the synthetic products.

Dr. Kuhn stated that the synthetic lubricating oil supplied for the Navy demonstration was prepared by blending equal portions of a synthetic lubricating oil of the ester type with a highly refined mineral oil. The mineral oil is used to supply "body" to the ester and to "wet" the metal of the engine parts.

The synthetic grease serves a wider range of operating temperatures than any lubricant previously available. It is particularly suited for aircraft use in that it will operate satisfactorily between a subzero temperature of —65° and a high temperature of 250°. The grease is made from 20 percent soap and a special synthetic oil.

Postpone International Exposition

THE Twelfth International Petroleum Exposition, originally scheduled to be held in Tulsa next May, has been postponed until the spring of 1948, according to an announcement by Frank J. Hinderliter of the Hinderliter Tool Company. Although early indications were that the oil industry was planning for the largest exposition ever held, the committee postponed the show when it was shown that lack of construction materials, building restrictions, and housing problems would considerably hamper the exposition.

"We regretted very much having to postpone the show, but the shortage of construction materials coupled with governmental building restrictions make it impractical for us to continue with plans for the exposition before the spring of 1948," Mr. Hinderliter said. "In addition, the problem of housing the huge number of exhibitors and members of the industry who would attend the show was proving an insurmountable problem."

Ferodo Expanding Facilities

FERODO LIMITED, Chapel-en-le-Frith, Derbyshire, England, clutch lining manufacturers, have decided to make extensive additions to the plant and buildings at the factory at Chapel-en-le-Frith. Increasing use of Ferodo products, particularly in connection with road and rail transport, have made this expansion necessary. An extensive scheme has been planned, and a large number of building trade operatives will be employed for about two years.

Twelve service depots are already operating in the British Isles and Eire, and three new service depots in South London, Ipswich and Edinburgh will be opened in the near future. Agents and representatives are already established in practically every country in the world to offer a complete range of friction mations to meet every need of transport and industry.

Adds Engineering Course

MONTANA SCHOOL OF MINES is adding courses in petroleum engineering and geology to its curricula. The board of education made this change at the request of Montana oil men who suggested that there is an active demand for young engineers who will be graduated.

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C_2H_5

Mol. Wt.	141.9
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Boiling Pt.	125°C
Spec. Gr.	1.14 at 25°C
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Some of the Principal Reactions Catalyzed by BF_3

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2. Condensation of aromatic nuclei with olefins and diolefins, paraffins, and olefins, and aromatic nuclei or olefins with acids.

3. As a cyclizing agent for rubber.

4. As an esterification catalyst.

5. As a catalyst in the synthesis of aliphatic acids from alcohols and carbon monoxide.

6. As a promoter and dehydrating agent in the sulfonation and nitration of aromatic compounds.

E. . P. van der Linden

James E. T. Woodburn

Victor Graf

Forms British Subsidiary

SEISMOGRAPH SERVICE LIMITED, a British subsidiary of the Seismograph Service Corp., has been incorporated under the laws of the United Kingdom, to operate in the sterling area, it was announced here today by G. H. Westby, president. The sterling area includes such important oil producing regions as the Middle East, Netherlands East Indies, Burma, and the Island of Trinidad.

Operating headquarters will be in London. Operations will be in charge of E. J. P. van der Linden, managing director; James E. T. Woodburn, manager of field operations; and Victor Graf, manager of instrumentation. English attorneys will be Freshfields. Mr. van der Linden was formerly associated with S. S. C.; Woodburn was formerly Chief Geophysicist of Skelly Oil Co., and Graf only recently returned to S. S. C., after being on leave during the war for special work with the Naval Ordnance Department.

Elected Ideco Vice President

J. D. McEWEN has been elected vice president of International Derrick & Equipment Co., and made general manager of the California division. He succeeds L. R. Wells who has been transferred to the eastern operating area.

G. W. Walton, vice president in charge of machinery and export oil well sales, has been made responsible for Ideco's domestic and export oil well sales on the Pacific coast in addition to his other duties. Los Angeles sales offices are being moved to the plant at Torrance, California.

Joins Larkin Packer Co.

VIRGIL FLEMMING, Tulsa oil field equipment engineer, has been appointed sales representative for Larkin Packer Company, Inc., St. Louis. His sales territory will include Tulsa, Bartlesville, Ponca City, Fort Worth, and Dallas.

Flemming replaces S. M. "Puny" Blevens, who resigned recently to accept the position of vice president and sales manager for C. W. Cotton Supply Company.

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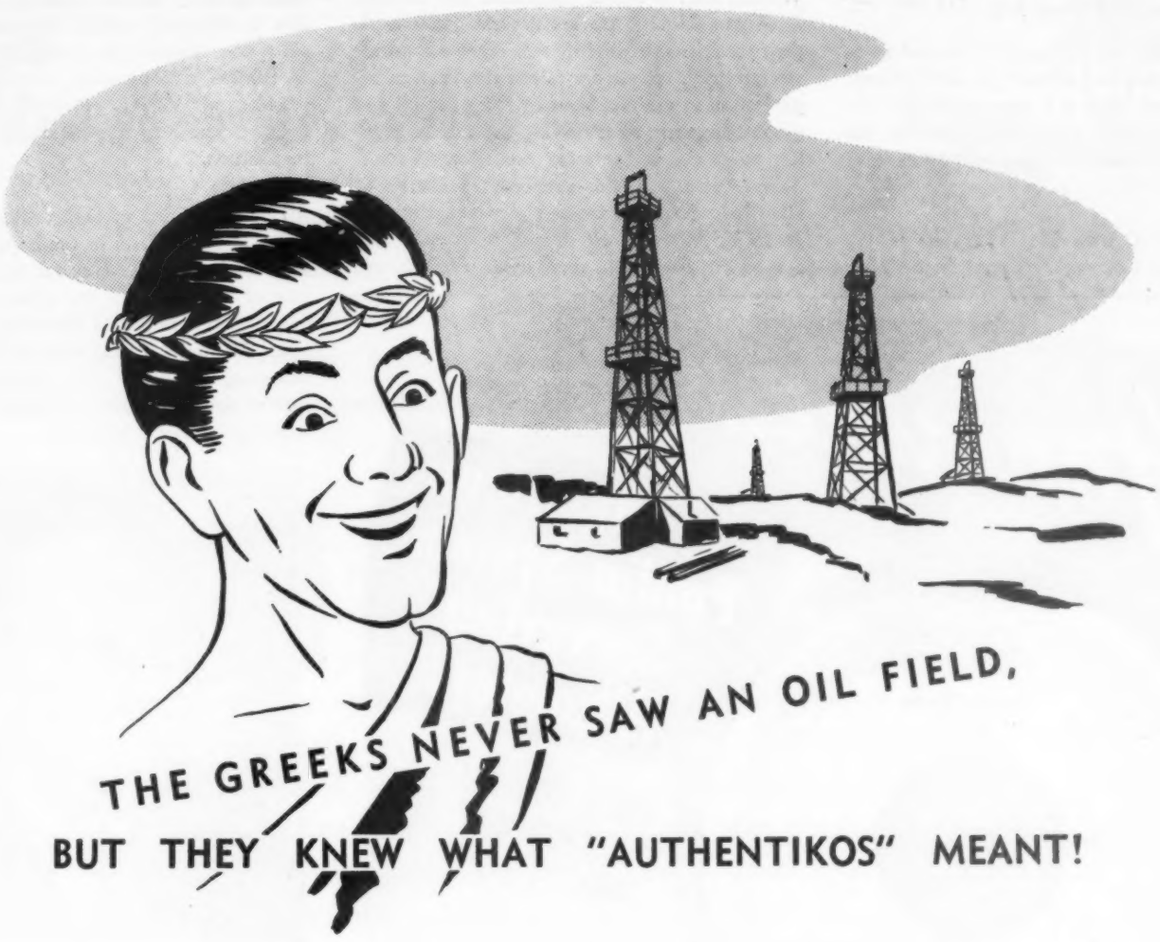

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Warren Plans Export Development

(Continued from page 44)

as secretary, and was in charge of natural gasoline manufacturing and oil and gas development. D. E. Buchanan, after a few years in the railroad business, became purchasing agent for the old Sapulpa Refining Co., then joined Chestnut & Smith about 1920 as sales manager.

These three men, with M. F. Waters of the Smith Separator Company, resigned from Chestnut & Smith in 1929, and formed Hanlon-Waters, Inc., to handle equipment, and Hanlon-Buchanan, Inc., to market natural gasoline. As their activities expanded the other companies were formed. Boyle has joined the Warren organization as vice president in charge of oil and gas development, after serving the various Hanlon companies as operating executive. Ray E. Miller, who was vice president in charge of sales, has joined Warren as a vice president, and James E. Allison, chief counsel for the Hanlon group, will handle the same duties for Warren.

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J. A. Padon, for many years a member of the internationally known accounting firm of Haskins & Sells and resident manager of its Tulsa office, has resigned his membership in that firm to become vice president and assistant to the president of Warren. He will devote his attention primarily to the financial affairs of the corporation.

All of the officers of both companies have been active in civic affairs in the southwest and have been leaders in the Natural Gasoline Association of America and the American Petroleum Institute and Liquefied Petroleum Gas Association. Hanlon has established the Hanlon award consisting of a watch and a plaque awarded each year to some man who has made an outstanding contribution to the industry.

G. P. Gregory, Jr.

Opens London Offices

ANNOUNCEMENT is made by G. P. Gregory, Jr., export manager for the Geo. E. Failing Supply Company of Enid, Okla., and Houston and Midland, Texas, of the appointment of O. V. Lindqvist as European Sales Representative. Lindqvist established his office in London in June. Lindqvist is a native of Sweden and is a graduate mining engineer. In America he has worked in Texas and Louisiana and abroad in Romania, Bulgaria, Jugoslavia and Poland.

Announces New Aneroid

A NEW SERIES of surveying altimeters built for all ranges in elevation with sensitivity of better than one part in 12,000 have been announced by the American Paulin System. These new aneroids have abandoned the chain-and-lever system to permit direct, frictionless reading of diaphragm movements. The instruments are responsive to elevation changes in inches. Temperature corrections or tapping to overcome instrument lag are unnecessary. The manufacturers claim to have developed an instrument which will withstand jolts, jars and vibrations in field use for preliminary surveys.

Erratum

Lion Oil Company earnings in the first quarter of 1946 were $0.71 per share. Due to a typographical error earnings were shown as being $0.17 in the article on Oil Company Earnings in the June issue of WORLD PETROLEUM.

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To no single industry does the use of aircraft present such revolutionary possibilities as it does in oil drilling. Remotely sited or inaccessible workings can be reached in minutes or hours instead of days or weeks. Air Transport for key technicians and urgently needed spares reduces production hold-ups to a minimum. Speedy despatch of medical supplies, availability of air ambulance services, establishes close touch with civilization. Daily supplies of hitherto unobtainable fresh foods, by maintaining fitness, increase output. Surveys and inspections are completed in a fraction of the time. In short, air transport by very considerably reducing the all important time factor when applied to "key" problems, increases output and, where weather is a limiting factor, may increase the number of working days. *In some cases, even one light aeroplane would serve the purpose!* But air transport, when reliable and economical, is a science in itself, whether for a fleet, or for a single aircraft. In whatever part of the world, Airwork Limited can provide the organisation for efficient and economic operation of your own air transport. Airwork Limited, the founders of Heston Airport, are the largest British Air Transport Contractors specialising in these problems since 1929.

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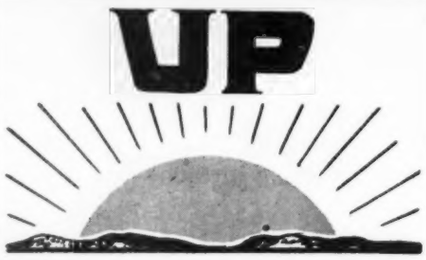

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Industrial Research and National Security

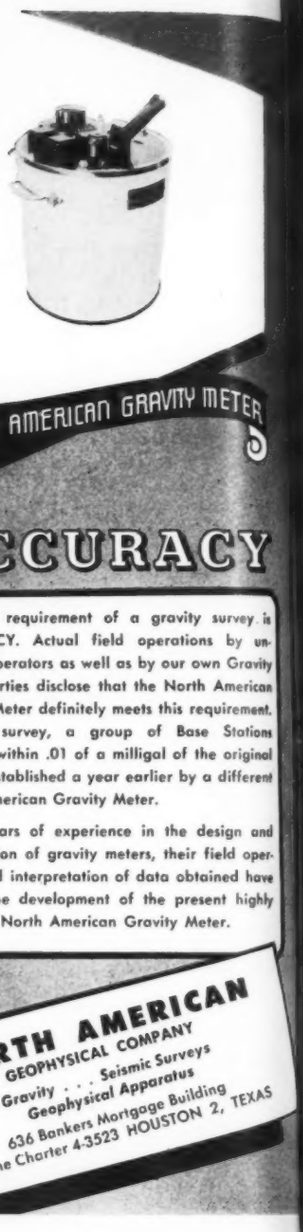
(Continued from page 47)

icy in this field. I am sure it will be agreed that any reduction of incentive in this important field of research and development would be nothing less than catastrophic.

Dr. Langmuir, of the General Electric Company, in his testimony before the McMahon Committee, described the powerful and far-reaching incentives which Russia has provided in the field of atomic energy and other scientific provinces, incentives in the form of extraordinary government encouragement and truly impressive material rewards for achievement. The Russians, he said, "are adopting an incentive system even more effective than that which we have inherited from our capitalistic system. If we continue through the effects of government policies and labor legislation to overlook the incentive upon which our progress has depended, we may expect a period during which Russia will forge ahead far more readily than we do." To me it seems clear beyond a doubt that if we should in any way reduce our own industrial initiative by lessening our incentive in this vital field, we may be surpassed by other nations.

We need not be surpassed by anyone. During the war, government, science, and industry worked as a well-coordinated team, and I am certain that no member of the team has any intention today of weakening that cooperation. Therefore, I am convinced that a formula can and will be found which will safeguard the public interest and at the same time give our industrial research and development agencies the freedom and incentive to cultivate vigorously the new scientific fields in which American technical genius was largely instrumental in breaking soil. My optimism is rooted in my deep confidence in our people. Every time in the past that our nation has been called upon to meet a challenge, it has responded in a measure far beyond our anticipation. We have never been able to appreciate or even grasp the enormous sweep of the capacity of this great nation of ours. It never ceases to amaze us. The very fact that we can, in a national emergency, rise to heights of production and strength beyond even our own expectations seems to me a very good proof that our system is basically sound. We should therefore endeavor in every way to strengthen it and should move with extreme caution in attempting to change it.

Up to now, the basis of our vigorous industrial development has been the desire of one individual to progress beyond another, to win the reward for making a product better, or making it available easier or cheaper. To retain the character of this system we must not sacrifice the incentives that make it possible. Let us be sure that the ultimate result of any legislation now contemplated will be beneficial to the basic industrial development upon which both our well-being and national safety depend.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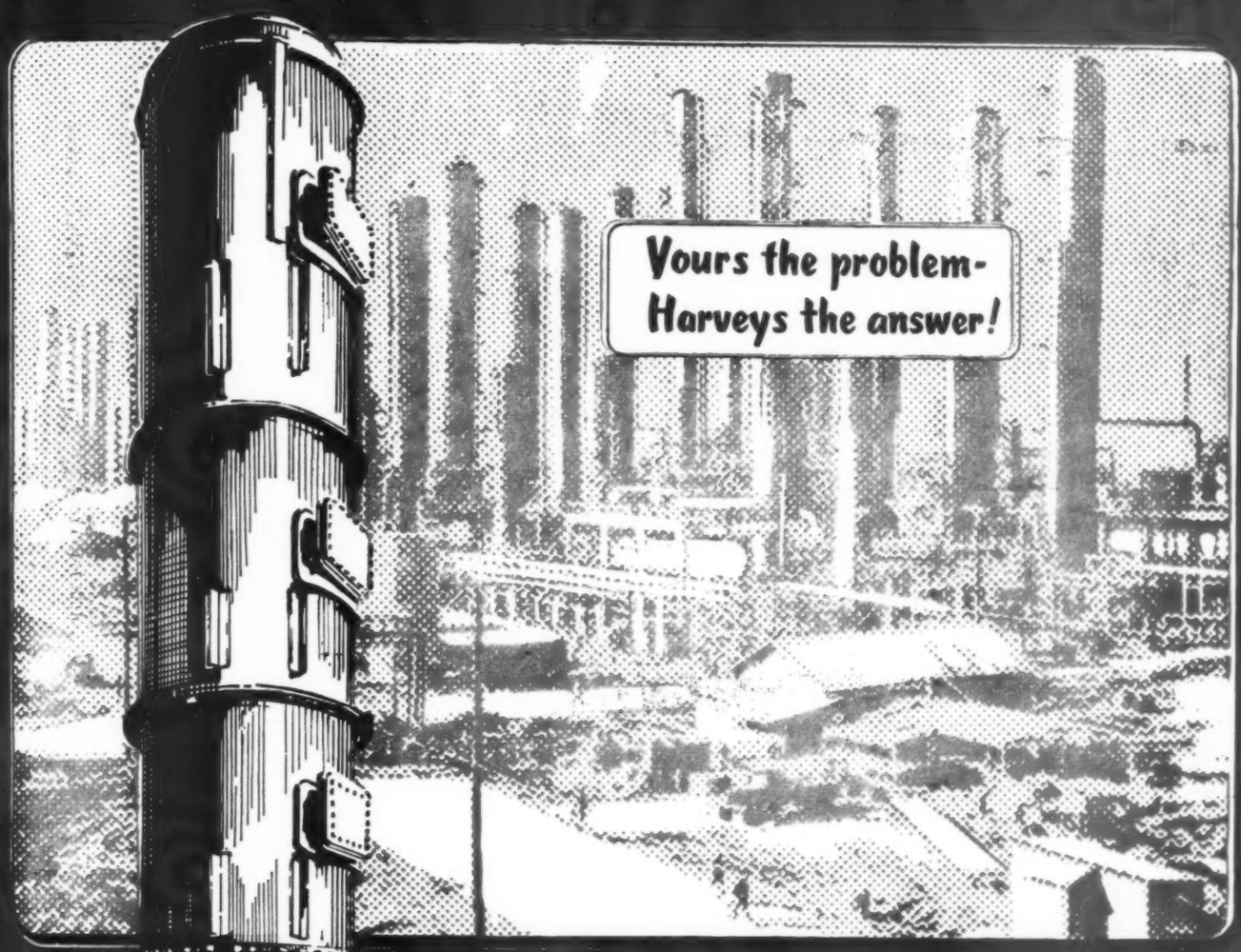

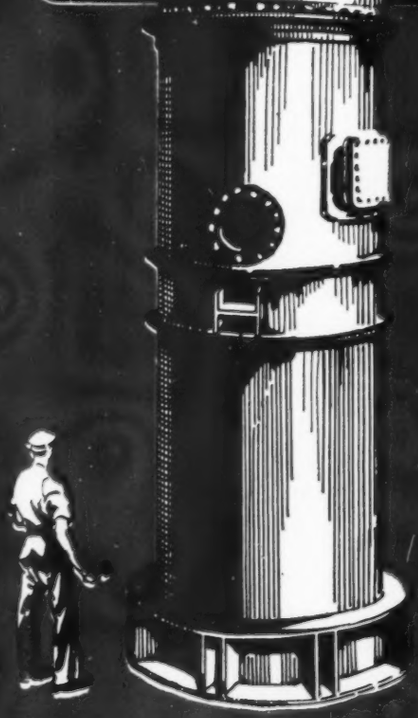

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Venezuelan Oil Policy May Offset World Situation

(Continued from page 38)

party would baffle even Stalin himself as it is split into three factions which are more intensely interested in fighting intra-mural issues than in following any Moscow party line. Furthermore, Venezuelan devotion to independence is as much a heritage from Simon Bolivar to Venezuelans as that of the United States is from George Washington. Any political system evolved in Venezuela will be as peculiarly Venezuelan as any change of government in the United States will always be a strictly American product.

In international oil circles interest in Venezuelan developments is concerned with its bearing upon the possible competitive situation between Venezuelan and Arabian oil. Such competition is likewise a matter of prime concern to the Venezuelan government. For the first time, Venezuela is beginning to think of the formulation of an international oil policy. Its government is studying the possibilities of suming its responsibility as a leader in w oil affairs rather than concentrating upon its mestic relations with the oil companies as it up to now.

President Betancourt has long been intere in seeing Venezuela actively participate in n tiations for international oil accord. While mer Secretary of Interior Harold L. Icke in London last year discussing the final d of the proposed Anglo-American oil treaty, P ident Betancourt, in his capacity as a poli leader of Accion Democratica, wrote forc newspaper editorial urging that Venezuela sh be represented in those conferences. Now, President, his interest in international oil velopments has become intensified.

New Petroleum Register

THE 24th edition of the Petroleum Regis which is now ready for delivery, contains pages of data regarding active oil compan throughout the world. In the case of the m important companies the Register gives t history, capital and corporate structures, af tions and subsidiaries. Concessions, proper manufacturing, transportation, and distribut facilities are recited.

The new edition contains more than the n mal number of changes because no Register published in 1944 in view of the war-time pa shortage. Special attention has been given the South American section.

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